CHRYSLER

CODE READER SYSTEM

OWNER'S MANUAL

For most fuel injected 1983 to 1997 Chrysler, Dodge, Plymouth, and 1993 to1997 Jeep vehicles.

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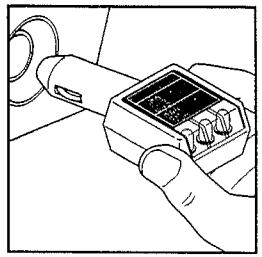
You Can Do It!

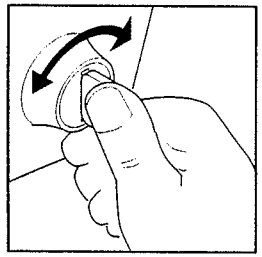
1 Connect battery and charging system tester

- Read LEDs for results.



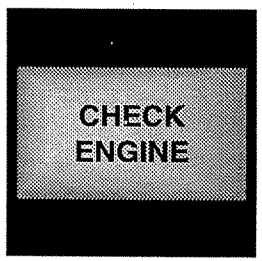
2 Cycle vehicle's ignition key

- The vehicle's ignition key is used in a simple on-off procedure to begin the code retrieval process.



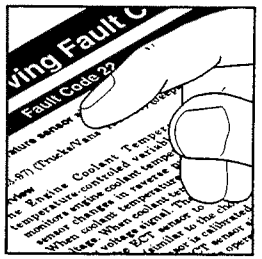
3 Read Fault Codes

- Read fault codes from flashing "Check Engine" light, "Power Loss" lamp or "Malfunction Indicator" lamp.



4 Pinpoint Problems

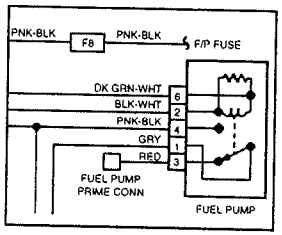
- Locate fault code(s) in the Fault Code Definitions list.



1.1 VEHICLE SERVICE MANUALS

It is recommended that you consult the manufacturer's instructions and specifications in these service manuals before any test or tuneup procedures are performed.

IMPORTANT: You **MUST** use the wiring diagrams in your vehicle's service manual to ensure proper connections during testing.



TYPICAL WIRING DIAGRAM

Contact your local car dealership, auto parts store, bookstore or public library for availability of these manuals. The following companies publish valuable repair manuals:

- **Chrysler Corporation**
  Tech Authority
  P.O. Box 3315
  Livonia, Michigan 48151-9969
  Phone: (800) 626-1523
- **Haynes Publications**
  861 Lawrence Drive
  Newbury Park, California 91320
  Phone: (805) 498-6703
- **Chek-Chart Publications**
  1515 Grandview Parkway
  Sturtevant, Wisconsin 53177
  Phone: (800) 662-6277
- **Mitchell International**
  9889 Willow Creed Road
  P.O. Box 26260
  San Diego, California 92196-0260
  Phone: (619) 578-6550
- **Motor Publications**
  5600 Crooks Road
  Troy, Michigan 48098
  Phone: (800) 426-6867

1.2 PRELIMINARY VEHICLE DIAGNOSIS WORKSHEET

The purpose of this form is to help you gather preliminary information on your vehicle before you retrieve codes. By having a complete account of your vehicle's current problem(s), you will be able to systematically pinpoint the problem(s) by comparing your answers to the fault codes you retrieve. You can also provide this information to your mechanic to assist in diagnosis and help avoid costly and unnecessary repairs. It is important for you to complete this form to help you and/or your mechanic have a clear understanding of your vehicle's problems.

NAME:
DATE:
VIN*:
YEAR:
MAKE:
MODEL:
ENGINE SIZE:
VEHICLE MILEAGE:

*VIN: Vehicle Identification Number, found at the base of the windshield on a metallic plate, or at the driver door latch area (consult your vehicle owner's manual for location).

TRANSMISSION:

- ❑ Automatic
- ❑ Manual

Please check all applicable items in each category.

DESCRIBE THE PROBLEM:

WHEN DID YOU FIRST NOTICE THE PROBLEM:

- ❑ Just Started
- ❑ Started Last Week
- ❑ Started Last Month
- ❑ Other:

LIST ANY REPAIRS DONE IN THE PAST SIX MONTHS:

PROBLEMS STARTING

- ❑ No symptoms
- ❑ Will not crank
- ❑ Cranks, but will not start
- ❑ Starts, but takes a long time

ENGINE QUITS OR STALLS

- ❑ No symptoms
- ❑ Right after starting
- ❑ When shifting into gear
- ❑ During steady-speed driving
- ❑ Right after vehicle comes to a stop
- ❑ While idling
- ❑ During acceleration
- ❑ When parking

IDLING CONDITIONS

- ❑ No symptoms
- ❑ Is too slow at all times
- ❑ Is too fast
- ❑ Is sometimes too fast or too slow
- ❑ Is rough or uneven
- ❑ Fluctuates up and down

RUNNING CONDITIONS

- ❑ No symptoms
- ❑ Runs rough
- ❑ Lacks power
- ❑ Bucks and jerks
- ❑ Poor fuel economy
- ❑ Hesitates or stumbles on accelerations
- ❑ Backfires
- ❑ Misfires or cuts out
- ❑ Engine knocks, pings or rattles
- ❑ Surges
- ❑ Dieseling or run-on

AUTOMATIC TRANSMISSION PROBLEMS (if applicable)

- ❑ No symptoms
- ❑ Shifts too early or too late
- ❑ Changes gear incorrectly
- ❑ Vehicle does not move when in gear
- ❑ Jerks or bucks

PROBLEM OCCURS

- ❑ Morning
- ❑ Afternoon
- ❑ Anytime

ENGINE TEMPERATURE WHEN PROBLEM OCCURS

- ❑ Cold
- ❑ Warm
- ❑ Hot

DRIVING CONDITIONS WHEN PROBLEM OCCURS

- ❑ Short - less than 2 miles
- ❑ 2 ~ 10 miles
- ❑ Long - more than 10 miles
- ❑ Stop and go
- ❑ While turning
- ❑ While braking
- ❑ At gear engagement
- ❑ With A/C operating
- ❑ With headlights on
- ❑ During acceleration
- ❑ Mostly driving downhill
- ❑ Mostly driving uphill
- ❑ Mostly driving level
- ❑ Mostly driving curvy roads
- ❑ Mostly driving rough roads

DRIVING HABITS

- ❑ Mostly city driving
- ❑ Highway
- ❑ Park vehicle inside
- ❑ Park vehicle outside
- ❑ Drive less than 10 miles per day
- ❑ Drive 10 to 50 miles per day
- ❑ Drive more than 50 miles per day

GASOLINE USED

- ❑ 87 Octane
- ❑ 89 Octane
- ❑ 91 Octane
- ❑ More than 91 Octane

WEATHER CONDITIONS WHEN PROBLEM OCCURS

- ❑ 32 ~ 55° F (0 ~ 13° C)
- ❑ Below freezing (32° F / 0° C)
- ❑ Above 55° F (13° C)

CHECK ENGINE LIGHT / DASH WARNING LIGHT

- ❑ Sometimes ON
- ❑ Always ON
- ❑ Never ON

PECULIAR SMELLS

- ❑ "Hot"
- ❑ Sulfur ("rotten egg")
- ❑ Burning rubber
- ❑ Gasoline
- ❑ Burning oil
- ❑ Electrical

STRANGE NOISES

- ❑ Rattle
- ❑ Knock
- ❑ Squeak
- ❑ Other

1.3 SAFETY PRECAUTIONS

- Always observe safety precautions whenever working on a vehicle.

a. Always wear safety eye protection.

b. Only work on your vehicle in a well-ventilated area.

c. Put transmission in "park" (for automatic) or "neutral" (for manual). Set parking brake.

d. Put blocks on drive wheels.

e. Avoid moving fan blades or any potentially moving parts.

f. Avoid hot engine parts.

g. Turn off ignition before connecting (or disconnecting) any testing equipment.

h. Please read your vehicle's service manual and follow it's safety procedure.

1.4 YOUR VEHICLE'S COMPUTER SYSTEM

Today's vehicles are equipped with computer self-testing abilities that can locate problems in your vehicle and store them as fault codes in the vehicle's on-board computer. The procedures provided in this manual will allow you access to the computer's memory to recall the fault codes.

1.4.1 Chrysler Motors On-Board Computer Systems

Chrysler Motors introduced its first electronic fuel injected vehicle in late 1983. The on-board computer management systems used on Chrysler vehicles have evolved over the years, and their names have changed accordingly.

1983-87: The on-board computer used in these vehicles is a split-system, composed of two separate units: the Logic Module and the Power Module. The Logic Module contains a microprocessor which processes data received from sensors located throughout the vehicle and makes decisions (based on these inputs) which effect engine operation. The Logic Module is usually located on the right-hand side, behind the kick panel. The Power Module supplies operating power to the Logic Module, and contains the circuits which control the high-current devices. Power Module operation is controlled by the Logic Module. The Power Module is located in the engine compartment, near the vehicle's battery.

1987-90: This system is called a Single Module Engine Controller (SMEC). This system still uses two separate circuit boards (Logic Module and Power Module). However, both circuit boards are located in a common enclosure.

1989-95: This system is called a Single Board Engine Controller (SBEC). On this system, the Logic Module and Power Module circuit boards are integrated on a single circuit board.

1993-97: Beginning in 1993, the computer was renamed the Powertrain Control Module (PCM). In addition to controlling the engine management system and emission system, the computer also takes an active role in controlling powertrain (transmission system) operation.

NOTE: *Unless otherwise specified, all references to "computer" within this manual also apply to "Logic Module/ Power Module", "SMEC", "SBEC" or "PCM".*

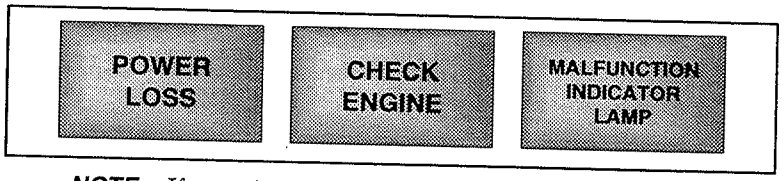
1.4.2 Basic On-Board Computer System Operation

The purpose of the vehicle's on-board computer is to provide maximum engine performance with the least amount of pollution. To accomplish this task, the computer uses a variety of input devices (sensors and switches) which provide voltage signal inputs, representing current engine operating conditions, to the computer. The computer's memory is programmed with an "optimum voltage value" for each sensor for every possible vehicle operating condition (idle, low-speed driving, high-speed driving, etc.). The computer continuously monitors the voltage signals from the various input devices and compares the voltage input signal values with the "optimum voltage values" programmed in its memory. Since vehicle operating conditions change constantly, the computer continually makes adjustments or corrections, especially to the air/fuel mixture and spark timing, to keep all the engine systems (fuel, ignition, emissions, etc.) operating within the programmed "optimum voltage values".

If an input device is operating above or below its operating voltage range, or if an output device fails to respond (or responds improperly) to the computer's commands, the computer's on-board diagnostics generates a two-digit fault code, and stores the code in it's memory. When an emission-related code is generated, the vehicle's Check Engine Light or Malfunction Indicator Light (MIL) will illuminate.

1.4.3 Instrument Panel indicator Lights

Your vehicle's instrument panel has either a "Power Loss", "Check Engine" or "Malfunction Indicator Lamp", depending on the year of the vehicle. These lights do more than tell you to check for engine and other component malfunctions. They can also transmit the fault codes in the computer's memory by blinking on and off.



NOTE: *If your instrument panel indicator lights do not come on when you turn on the ignition, please refer to your vehicle's service manual. You may have problems in the car's circuitry. You must fix these problems before you can obtain fault codes from your vehicle's on-board computer.*

1.4.4 Servicing Fault Codes

Diagnostic trouble codes indicate a problem in a circuit, not necessarily a faulty component. **DO NOT** replace components based only on trouble codes without first following the service procedures described in your vehicle's repair manual. Most faults (including those that set trouble codes) are caused by damaged, shorted or open wiring, damaged or corroded connections, improper voltages or grounds, or other mechanical problems.

Sometimes a fault in one circuit or system will cause the computer to set a fault code for a different circuit or system.

Example:

A defective spark plug wire can cause a "rich or lean condition" fault code to be set on the oxygen sensor circuit. In this case, replacing any component in the oxygen sensor circuit will not correct the fault, because the problem is caused by the defective spark plug wire and not by the oxygen sensor circuit. This is called a "false" code.

For this reason, it is **IMPORTANT** that you make a thorough inspection of all systems: wiring, hoses, vacuum, engine mechanical, charging, ignition, power, ground, fuel, (some of these systems are not connected to the computer system, but will still affect it) before retrieving trouble codes. Refer to your vehicle's service/repair manual for specifications and system testing procedures which apply to your particular vehicle.

There are two types of fault codes possible:

- **"Hard" Codes** - "Hard" codes represent problems which are happening now and cause the instrument panel indicator light to illuminate and remain on until the failure is repaired. A fault code is stored in the computer's memory for access later.
- **"Intermittent" Codes** - "Intermittent" codes may cause the instrument panel indicator light to flicker or stay on until the intermittent malfunction goes away. However, the corresponding fault code will be stored in memory for access later. If the malfunction does not reappear within a predetermined length of time (normally measured by ignition key start cycles), the computer will automatically erase the related fault code.

1.4.5 Before You Begin

- Fix any known mechanical problems before performing any test.

Make a thorough check before starting any test procedure. Loose or damaged hoses, wiring, or electrical connectors are often responsible for poor engine performance, and in some cases they may cause a "false" fault code.

Please read your vehicle's service manual for proper connection of vacuum hoses, electrical wiring, and wiring harness connectors. Check the following areas:

a. All fluid levels
b. Air cleaner and ducts
c. Belts
d. Mechanical linkage associated with sensor
e. Vacuum hoses
f. Spark plugs and wires
g. Electrical wiring
h. Electrical connectors
i. Proper battery voltage
j. Fuel system components

2.1 VEHICLES COVERED

This manual covers Chrysler fuel injected vehicles from 1983-1997.

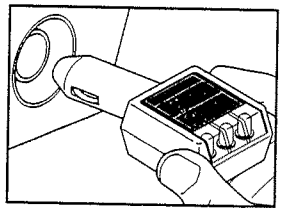
Type	Model Year	Model
Passenger Cars	1983-1997	Chrysler, Dodge and Plymouth Fuel Injected Models Only (Excluding Lasor/Talon 1.8L, 2.0L (ALL YEARS), 1990 Monaco/Premier)
Light Truck and Vans	1987-1997	Chrysler, Dodge and Plymouth Fuel Injected Models Only
	1992-1997	Diesel Models
Jeep	1993-1997	Jeep Fuel Injected Models Only

2.2 RETRIEVING FAULT CODES

- Always observe safety precautions before and during testing process. (See paragraph 1.3.)
- Fix any known mechanical problems before this test.
- Have a pencil and paper handy.
- Proper battery voltage and charging system voltage is critical for operation of the components of the engine management system. If improper voltage (too high or too low) is applied to the various sensors, actuators, switches and computer, these components may malfunction and set a fault code. A battery and charging system tester is used as part of code retrieval procedures.

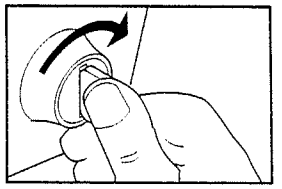
Battery Test

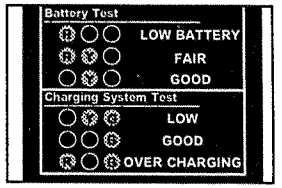
1. Plug the battery and charging system tester (included in kit) into the vehicle's cigarette lighter socket.



NOTE: *Some vehicles are not equipped with a cigarette lighter, or the receptacle is a different size than the tester. On these vehicles, use a voltmeter (purchased separately) to test the battery and charging system. Refer to your vehicle's service manual for procedures.*

2. Turn on ignition. **DO NOT START THE ENGINE.**
3. Turn the headlights on low beam.
4. Wait one minute, then read results from the tester LEDs:

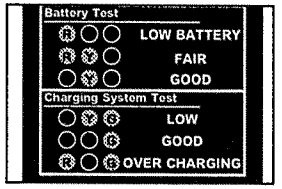




- If a "GOOD" battery is indicated, proceed to step5.
- If a "FAIR" or "LOW" battery is indicated, repair before proceeding.

Charging System Test

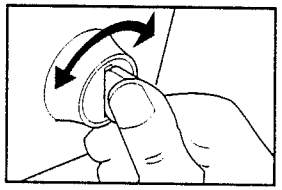
5. Put the transmission in "park" (for automatic) or "neutral" (for manual). Set the parking brake.
6. Start and run the engine for several minutes (or until it reaches normal operating temperature).
7. Once the engine reaches operating temperature, raise and hold engine speed at approximately 2500 RPM. Read results from the tester LEDs:



- If a "GOOD" charging system is indicated, proceed to step 8.
- If a "LOW" or "OVER CHARGING" system is indicated, repair before proceeding.

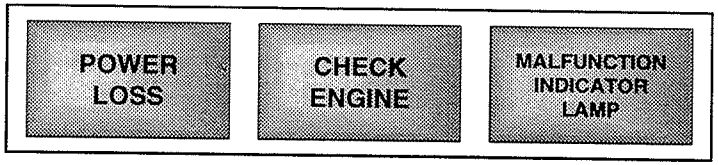
Retrieving Codes

8. **SLOWLY** let engine speed return to idle. Remove the battery and charging system tester.
9. For vehicles equipped with air conditioning **ONLY:** Switch the air conditioning "on" and "off".
10. For vehicles equipped with automatic transmission **ONLY:**
    - Press and hold the brake pedal down.
    - Select each gear position on the transmission, in turn (Reverse, Drive, Low, etc).
    - Return the gear selection to "Park".



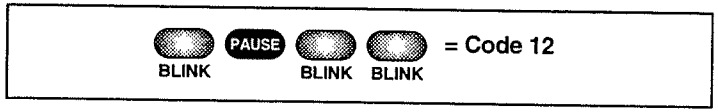
11. Turn the engine off. **WITHOUT** starting the engine again, turn ignition "on", "off", "on", "off" and "on" again within 3 seconds.

12. Read the fault codes from the flashing "Power Loss" Lamp (1983-1987), "Check Engine Light" (1988-1992), or "Malfunction Indicator Lamp" (1993-1997) on your vehicle's instrument panel.

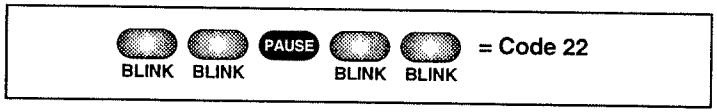


NOTE: *If the instrument panel light does not blink after key on/off cycling procedure is complete, repeat step 11. If the light still fails to blink, refer to your vehicle's service manual for information on checking the circuitry.*

- All fault codes are two digits.
- Each code is transmitted **ONLY** once before the next code is sent. **THE CODES ARE DELIVERED RAPIDLY. IF ANY CODES ARE MISSED, REPEAT THE RETRIEVAL PROCEDURES.**
- Count the number of blinks to get the fault codes:
- Code 12 looks like:



- Code 22 looks like:



13. Refer to "Fault Code Definitions" (paragraph 2.4) to determine the meaning of the fault code.
14. Turn off the ignition.

2.2.1 Servicing Fault Codes

Fault codes indicate a problem in a circuit, **NOT** necessarily a malfunctioning component. **DO NOT** replace components based only on fault codes without first following the service procedures described in your vehicle's repair manual. Most problems (including those that set fault codes) are caused by damaged, shorted or open wiring; damaged or corroded connections; improper voltages or grounds; or other mechanical problems.

For this reason, it is **IMPORTANT** that you make a thorough inspection of all systems: wiring, hoses, vacuum, engine mechanical, charging, ignition, power, ground, fuel, (some of these systems are not part of the computer system, but they may still affect it) **BEFORE** retrieving fault codes. Refer to your vehicle's repair manual for specifications and system testing procedures, which apply to your specific vehicle.

2.3 ERASING FAULT CODES

- Always observe safety precautions before and during testing process.

WARNING: *On 1996 and 1997 model vehicles, **DO NOT** erase the codes in the computer's memory by disconnecting the battery. If the battery is disconnected to erase the codes in these systems, you will also erase valuable information from the computer's memory. The fault codes are set **ONLY** if certain conditions are met. If the computer's memory is cleared, the problem that set the fault code will still be present, but the code will not reset in the computer's memory until the vehicle encounters the same conditions that set the code in the first place. The fault code could be reset right away, or it could take several days. If the problem that set the code in the computer (and made the Malfunction Indicator Light (MIL) turn "on") is repaired, the MIL will turn "off", but the code will stay in the computer's memory for a predetermined period of time (Usually 40-80 warm up cycles).*

1. Turn off the ignition.
2. Disconnect the negative battery cable to disconnect power from the vehicle's computer.
3. Wait fifteen seconds for fault codes to be erased from the computer's memory.
4. Reconnect the negative battery cable.

NOTES:

1) Whenever the battery is disconnected to clear the fault codes, code 12 will remain in the computer's memory. The computer will automatically erase code 12 whenever a predetermined number of ignition cycles (20-100 depending on the year and model of your vehicle) has been reached.

2) Once the computer's memory has been erased your vehicle may run rough for up to 40 miles while new information is being saved in the vehicle's computer. If the battery cable is removed, you will have to reprogram your radio and clock.

2.4 FAULT CODE DEFINITIONS

- CODE DEFINITION - Identifies the circuits and/or components associated with the fault code, and lists the vehicle make and model years to which each code definition applies.
- OVERVIEW - Provides a brief overview of the operation or function of the system associated with the specific fault code definition, and expands on the definition of the particular code.
- PROBABLE CAUSE - Lists the most probable problems which may cause the particular fault code to be set.

NOTE: *Unless otherwise specified, not all trouble codes with multiple fault code definitions may apply to all years and or models of vehicles listed. Consult your vehicle's repair manual for the proper fault code definition application.*

Fault Code 11

1. Timing belt skipped one or more teeth
(Cars 1996-97)

Overview
The timing belt keeps the camshaft(s) synchronized with the crankshaft. The initial position of the camshaft in relation to the crankshaft is "learned" by the computer, and this "initial learned position" is stored in the computer's memory. If at any time the position of the camshaft (in relation to the crankshaft) changes by the equivalent of one or more timing belt teeth from the "initial learned position", the computer determines the camshaft(s) is out of synchronization with the crankshaft and sets code 11.

Probable Cause
- Engine valve timing is out of specification
- Relative position of camshaft to crankshaft not relearned

NOTE: *After any work is performed on the valve train, camshaft(s), crankshaft, or their related components, a relearn procedure might be necessary. Professional help is recommended.*

2. Misfire adaptive numerator at limit
(Cars/Trucks/Vans 1995-97)

Overview
The computer monitors engine RPM to aid in detecting engine misfire. The computer accomplishes this by "learning" and compensating for crankshaft machining variations. The computer uses two sections of the crankshaft (40° windows) which are 180° apart (diametrically opposite). First, it learns the position of the first 40° window (reference window), corresponding to cylinders #1 and #4. Then it learns the position of the second 40° window, corresponding to cylinders #2 and #3, and compares this window to the reference window. The computer gathers this information while the vehicle is decelerating from a speed above 36 mph, the throttle is closed, and the coolant temperature is above 75°F. If the variance between the two windows is less than 2.86%, the computer is able to make the appropriate RPM adjustments. If the variance exceeds 2.86%, the computer will consider this excessive, and sets code 11.

Probable Cause
- Open or shorted wiring

- Dirty or loose connectors
- Improper voltages or grounds
- Low compression in one or more cylinders
- Crankshaft position sensor improperly installed
- Possible mechanical problems in crankshaft or related components
- Severely worn crankshaft bearings
- The computer's "relearn" procedure was not performed or was performed improperly after a component was replaced in this circuit. Clear the computer's memory and perform the relearn procedure to establish base parameters (consult your vehicle's repair manual for procedures).

3. **No distributor, camshaft or crankshaft reference signal detected during cranking**
(Cars 1983-97) (Trucks/Vans 1987-97) (Jeeps 1993-97)

Intermittent loss of camshaft or crankshaft sensor signal
(Cars/Trucks/Vans/Jeeps 1996-97)

Overview
The computer uses several sensors to monitor distributor, camshaft and/or crankshaft rotation. As the distributor, camshaft or crankshaft rotate, their respective sensors generate a reference voltage signal. By monitoring these signals, the computer "knows" the position of each cylinder, and which cylinder is coming up on the next compression stroke. The computer uses this information for ignition and fuel injection timing. If the computer does not receive reference voltage signals from these sensors when the engine is cranking, it sets Code 11.

Probable Cause
- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages or grounds
- Defective sensor
- Mechanical problems in camshaft and/or crankshaft
- Defective distributor (if equipped)
- Defective computer

Fault Code 12

Direct battery input power to computer lost or interrupted.
(Cars 1983-97) (Trucks/Vans 1987-97)

Overview
Whenever the battery is disconnected to clear fault codes, code 12 remains in the computer's memory. Code 12 is automatically erased when a predetermined number of ignition key-on cycles (20-100, depending on the year and model of the vehicle) has been reached.

Probable Cause
- Recent replacement of the vehicle's battery
- Codes cleared by removing battery power

Fault Code 13

No change or small change in (MAP) Manifold Absolute Pressure sensor readings between the periods of key-on engine off (atmospheric pressure) and key-on engine running (low pressure).
(Cars 1983-97) (Trucks/Vans 1988-97)

Overview
The Manifold Absolute Pressure (MAP) sensor monitors changes in intake manifold pressure and sends (inputs) a voltage signal to the computer that represents the current intake manifold pressure. Intake manifold pressure is higher when the engine is off (atmospheric pressure) than when the engine is running (low pressure). If the computer does not detect sufficient change in intake manifold pressure between the key-on engine-off period and the key-on engine-running period, the computer sets code 13.

Probable Cause
- Restrictions or leaks in vacuum hose or ports in the MAP sensor circuit
- Dirty or loose connectors
- Improper voltage or ground
- Defective MAP sensor
- Defective computer

Fault Code 17

1. Knock sensor circuit problem
(1985-86 Turbo vehicles only)

Overview
The knock sensor detects the vibrations caused by "pinging" or "detonation" and converts the vibration to an electrical signal which is sent to the computer. When cylinder detonation is detected, the computer retards ignition timing to eliminate the detonation. If the knock sensor circuit is not working properly, pinging and spark knock may occur. This condition can lead to premature engine failure. If the computer detects a short or an open condition in the knock sensor circuit, it sets code 17.

Probable Cause
- Open or shorted wiring
- Dirty or loose connectors
- Defective knock sensor
- Defective computer

2. Coolant system temperature remains below normal
(Cars 1985-97) (Trucks/Vans 1987-97) (Jeeps 1993-97)

Overview
The Engine Coolant Temperature (ECT) sensor is a temperature-controlled variable resistor (thermistor) which monitors engine coolant temperature. The resistance of the ECT sensor changes in reverse proportion to coolant temperature. When coolant temperature is low, the sensor's resistance is high, and its voltage signal to the computer is high. When coolant temperature is high, the sensor's resistance is low, and its voltage signal to the computer is low. The computer uses the voltage input signal from the ECT sensor to adjust the air/fuel ratio during engine warm-up (similar to the choke function on a carbureted engine). The computer monitors the ECT sensor signal input to determine if the engine has reached operating temperature within a predetermined time period. If the engine fails to reach operating temperature within the specified time, the computer sets code 17.

Probable Cause
- Open or shorted wiring
- Dirty or loose connectors
- Defective thermostat
- Improper anti-freeze to water mixture ratio
- Defective ECT sensor

Fault Code 21

Oxygen sensor stays at center (no rich or lean signal detected when in closed loop)
(Cars 1983-95) (Trucks/Vans 1987-95) (Jeeps 1993-95)

Oxygen sensor shorted to voltage, signal too high
(Cars/Trucks/Vans 1990-95)

Right or left bank, upstream or downstream oxygen sensor, stays at center (no rich or lean signal detected when in closed loop), shorted to voltage, shorted to ground, slow response or heater failure
(Cars 1996-97) (Trucks/Vans Jeeps 1996-97)

Overview
The oxygen (O2) sensor monitors the vehicle's exhaust and generates a varying voltage signal of up to one (1) volt based on the amount of oxygen present in the exhaust gas. If the exhaust gas contains a large amount of oxygen (indicating a lean air/fuel mixture) the oxygen sensor generates a "low" voltage signal. If the exhaust gas contains very little oxygen (indicating a rich condition) the oxygen sensor generates a "high" voltage signal. A 450mV signal equates to the most efficient and least polluting (ideal) air/fuel ratio of 14.7 parts air to one part fuel.

The oxygen sensor must reach a temperature of 660°F before it produces a voltage signal, and the engine must reach operating temperature before the computer enters into closed loop operation. Some oxygen sensors are equipped with a heating element, which helps the sensor reach operating temperature more quickly. A properly operating oxygen sensor reacts quickly to the amount of oxygen in the exhaust stream and sends the information to the computer. A faulty sensor reacts slowly, or its voltage signal is weak or missing. Early Chrysler vehicles are equipped with one or two oxygen sensors; later models have up to four sensors. If a fault is detected in the oxygen sensor or the sensor's heater circuit, the computer sets code 21.

Probable Cause
- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Defective oxygen sensor(s)
- Defective computer

Fault Code 22

Coolant temperature sensor signal voltage out of range (too high or too low)
(Cars 1983-97) (Trucks/Vans 1987-97) (Jeeps/Diesels 1992-97)

Overview
The Engine Coolant Temperature (ECT) sensor is a temperature-controled variable resistor (thermistor) which monitors engine coolant temperature. The resistance of the ECT sensor changes in reverse proportion to coolant temperature. When coolant temperature is low, the sensor's resistance is high, and its voltage signal to the computer is high. When coolant temperature is high, the sensor's resistance is low, and its voltage signal to the comptuer is low. The computer uses the voltage input signal from the ECT sensor to adjust the air/fuel ratio during engine warm-up (similar to the choke function on a carbureted engine). The ECT sensor is calibrated to operate within a specific voltage range. If the ECT sensor signal voltage input to the computer is above or below it's operating range, the computer sets code 22.

Probable Cause
- Open or shorted wiring
- Dirty or loose connectors
- Defective ECT sensor
- Defective computer

Fault Code 23

Intake air, air charge or throttle body temperature sensor voltage signal out of range (too high or too low)
(Cars 1983-97) (Trucks/Vans 1987-97) (Jeeps/Diesels 1992-97)

Overview
The intake air, air charge and throttle body temperature sensors are temperature-controlled variable resistors (thermistors) which monitor air temperature in the intake manifold. The resistance of the sensors changes in reverse proportion to air temperature. The computer uses this information to adjust fuel injector pulse width ("on" time) and engine spark timing. These sensors are calibrated to operate within a specified voltage range (typically 0.3 to 4.8 volts), and the computer is calibrated to monitor the sensor within this range. If the sensor's signal voltage input to the computer is above or below it's operating range, the computer sets code 23.

Probable Cause
- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Defective sensor
- Defective computer

Fault Code 24

Throttle position sensor (TPS) signal voltage out of range (too high or too low)
(Cars 1983-97) (Trucks/Vans 1987-97) (Diesels 1992-97) (Jeeps 1993-97)

Overview
The Throttle Position Sensor (TPS) is a mechanically-controlled variable resistor (potentiomenter) which monitors throttle position. The resistance of the TPS sensor varies in direct proportion to throttle position. When the throttle is closed, the sensor generates a low voltage signal. As the throttle opens, the voltage signal increases until maximum voltage signal is reached at the wide-open throttle position. The computer uses this information to adjust ignition system timing and fuel injector pulse width ("on" time) during acceleration and deceleration. The TPS sensor is calibrated to operate within a specific voltage range (typically 0.2 to 1.5 volts at closed throttle and 3.4 to 5 volts at wide-open throttle), and the computer is preprogrammed to monitor the TPS sensor within this range. If the TPS sensor signal voltage input to the computer is above or below it's operating range, the computer sets code 24.

Probable Cause
- Open or shorted wiring
- Dirty or loose connectors
- Improper voltage or grounds
- Loose or misadjusted TPS
- Defective TPS
- Defective computer

Fault Code 25

Automatic Idle Speed control (AIS) motor or Idle Air control (IAC) motor circuit problem
(Cars 1987-97) (Trucks/Vans 1987-97) (Jeeps 1994-97)

Overview

The AIS/IAC motor is an electromagnetic device, with a movable pintle which allows air to bypass the throttle plate in the throttle body to control engine idle speed. The computer controls the position of the motor's pintle based on inputs received from sensors. If the computer detects a problem in the AIS/IAC motor circuit, it sets code 25.

Probable Cause

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages or grounds
- Defective AIS/IAC motor
- Defective computer

Fault Code 26

Fuel injector or fuel injector circuit problem
(Cars 1983-92) (Trucks/Vans 1987-92)

Overview

The fuel injector is an electromagnetic device which injects atomized fuel into the intake manifold. The computer controls the injector pulse width ("on" time) by energizing and de-energizing (pulsing) the injector. The computer pulses the injectors one or more times within 720° of crankshaft rotation. The amount of time the computer keeps the injector energized (on) varies depending on engine needs. This length of time is called a "duty cycle." An injector requires approximately four times more current to start the injection than to hold the injector on. If insufficient current is available to start fuel injection, the computer sets code 26.

Probable Cause

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- High resistance in circuit
- Defective injector
- Defective computer

Fault Code 27

Fuel injector control circuit problem
(Cars 1983-97) (Trucks/Vans 1987-97) (Jeeps 1993-97)

Overview

The fuel injector is an electromagnetic device which injects atomized fuel into the intake manifold. The computer controls the injector pulse width ("on" time) by energizing, and then de-energizing (pulsing) the injector. The computer pulses the injectors on and off one or more times within 720° of crankshaft rotation. The amount of time the computer keeps the injector energized (on) varies depending on engine needs (indicated through sensor inputs to the computer). This length of time is called a "duty cycle." An injector requires approximately four times more current to start the injection than to hold the injector on. If insufficient current is available to start fuel injection, the computer sets code 27.

Probable Cause

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Defective fuel injector
- Defective computer

Fault Code 31

Canister purge solenoid circuit problem, open or shorted condition detected at solenoid or solenoid circuit
(Cars 1983-97) (Trucks/Vans 1987-97) (Jeeps 1995-97)

Evaporative purge flow monitor failure (too high or too low), vapor flow detected during purge process
(Cars 1995-97) (Trucks/Vans Jeeps 1996-97)

Evaporative monitor leak or obstruction detected
(Cars/Trucks/Vans/Jeeps 1996-97)

Overview

Chrysler vehicles are equipped with a Fuel Evaporative system (EVAP) which helps prevent gasoline vapors from evaporating into the atmosphere. The EVAP system carries fumes from the fuel tank to the engine, where they are burned during combustion. The EVAP system consists of activated charcoal canister, fuel tank cap, purge solenoid and connecting tubes or hoses. Later vehicle models include a flow monitor and leak detector. Fumes

from the fuel tank are stored in the charcoal canister. The purge solenoid controls the flow of fuel vapors from the canister to the engine. The computer energizes or de-energizes the purge solenoid (depending on solenoid design). The purge solenoid opens a valve to allow engine vacuum to draw the fuel vapors from the canister into the engine where the vapors are burned. Purging only occurs when the engine is hot (above 145°F). If a problem develops in the EVAP system, the computer sets code 31.

Probable Cause

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages or grounds
- Defective purge solenoid
- Defective computer

Fault Code 32

EGR system failure or EGR solenoid circuit problem
(Cars/Trucks/Vans 1987-97) (Jeeps 1995-97)

Overview
The Exhaust Gas Recirculation (EGR) system reduces the formation of oxides of nitrogen (NOx) during combustion. Temperatures above 2500°F cause nitrogen and oxygen to combine and form NOx in the combustion chamber. To reduce NOx formation, combustion temperatures must be maintained below 2500°F. The EGR system recirculates small amounts of exhaust gas back into the intake manifold, where it is mixed with the incoming air/fuel mixture. This process reduces combustion temperatures by up to 500°F. The computer determines the time, duration and amount of exhaust gas to be recirculated back to the intake manifold. The computer also performs an EGR system function test at predetermined times during vehicle operation. If a problem is detected in the EGR system or if the EGR system fails the function test, the computer sets code 32.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Obstructions (carbon) in EGR system ports, tubes, hoses, etc.
- Defective EGR valve or related components
- Defective solenoid
- Defective computer

Fault Code 33

Air Conditioning (A/C) clutch relay circuit problem open or shorted condition detected
(Cars 1983-97) (Trucks/Vans 1987-97) (Diesel 1992-97) (Jeep 1993-97)

Air Conditioning (A/C) pressure sensor circuit problem (voltage is too high or too low)
(Cars 1994-97) (Trucks/Vans 1996-97)

Overview
The A/C compressor clutch relay supplies power to the A/C compressor to start and sustain A/C operation. When the A/C system is switched on, the computer checks the A/C pressure sensor signal input. If A/C system pressure is too high or too low, the computer will not energize the A/C relay. The computer also monitors engine idle speed while the A/C is on. If idle speed is too low, or if wide open throttle is detected, the computer de-energizes the A/C relay. The computer cycles the A/C on and off during normal A/C operation. If a problem is detected in the A/C clutch relay or A/C pressure sensor circuit, the computer will sets code 33.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Defective A/C relay
- Defective pressure sensor
- Defective computer

Fault Code 34

1. **EGR Solenoid circuit problem short or open in circuit detected**
(Cars 1983-87)

Overview
The Exhaust Gas Recirculation (EGR) system reduces the formation of oxides of nitrogen (NOx) during the combustion process. Temperatures above 2500°F cause nitrogen and oxygen to combine and form NOx inside the combustion chamber. To reduce NOx formation, combustion temperatures must be maintained below 2500°F. The EGR system recirculates small amounts of exhaust gas back into the intake manifold, where it is mixed with the incoming air/fuel mixture. This process

reduces combustion temperatures by as much as 500°F. The computer determines the time, duration and proper amount of exhaust gas to be recirculated back to the intake manifold. The computer also performs an EGR system function test at predetermined times during vehicle operation. If a problem is detected in the EGR system or if the EGR system fails the function test, the computer sets code 34.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Obstructions (carbon) in EGR system ports, tubes, hoses, etc.
- Defective EGR valve or related components
- Defective solenoid
- Defective computer

2. Speed control solenoid circuit problem
(Cars/Trucks/Vans 1987-97) (Diesel 1992-97) (Jeeps 1993-97)

Speed control switch circuit voltage out of range
(Cars/Trucks/Vans/Diesel/Jeeps 1994-97)

Overview

The computer controls operation of the speed control in response to operator commands. The speed control operating range is 35-85 MPH. When the speed control switch is turned on, the computer energizes a vacuum solenoid to hold the throttle at the set speed. The computer also uses the Vehicle Speed Sensor (VSS) signal input as a reference to keep the speed control at the desired speed. If the brake is applied or the speed control switch is turned off, the computer energizes a vent solenoid to disengage the speed control. The servo gets its power from a relay through the brake switch. If a problem develops in the solenoid circuit, or the switch circuit voltage is above or below it's operating range (typically 1.0 to 4.7 volts), the computer sets code 34.

Probable Causes:

Solenoid problems:

- Dirty, loose or defective connectors or wiring in solenoid circuits
- Open or shorted wiring in solenoid circuits
- Open or shorted speed control power supply circuit
- Defective solenoids
- Defective computer

Speed control switch problems:

- Dirty, loose or defective connectors or wiring in switch circuit
- Defective speed control switch
- Defective computer

Fault Code 35

Radiator cooling fan relay circuit problem
(Cars 1983-97) Trucks/Vans 1987-97) (Jeeps 1993-97) (Diesel 1996-97)

Overview

The electric cooling fan system draws air through the radiator to prevent the engine from overheating. The system consists of a fan, fan motor, fan relay and coolant temperature sensor. The computer monitors inputs from the temperature sensor, air conditioning system (if equipped) and other engine sensors. Based on these inputs, the computer determines when to energize or de-energize the fan relay (turn the cooling fan on or off). If a problem is detected in the cooling fan relay circuit, the computer sets code 35.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Defective fan motor

Fault Code 36

1. Air switching solenoid circuit problem (open or shorted)
(Cars/Trucks/Vans Rear Wheel Drive **ONLY** 1988-94)

Overview

The air switching solenoid is part of the air injection system. The air injection system consists of an air pump, the air switching solenoid, air switching relief valve, diverter valve and connecting hoses. The air injection system introduces air into the exhaust gas to aid in the oxidization (burning) of hydrocarbons (unburned fuel) and carbon monoxide (partially burned fuel) left over from the combustion process. The computer energizes and de-energizes the air switching solenoid to control the supply of engine vacuum to the air switching relief valve. When the solenoid is energized, engine vacuum is sent to the air switching relief valve, which then directs the output of the air pump to the intake manifold. When

the solenoid is de-energized, engine vacuum is removed from the air switching relief valve, and the valve directs the output of the air pump directly to the catalytic converter. If a problem is detected in the air switching solenoid, the computer sets code 36.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Defective solenoid

2. Wastegate solenoid circuit problem (open or shorted)
(Cars/Trucks/Vans Turbo **ONLY** 1983-94)

Overview
The wastegate is part of the turbocharger circuit. The wastegate limits the amount of turbocharger boost pressure by re-directing part of the exhaust gas away from the turbine to control the turbine's speed. The computer controls the wastegate operation by energizing and de-energizing the wastegate solenoid based on the intake manifold pressure sensor input. If a problem is detected in the wastegate solenoid circuit, the computer sets code 36.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Defective solenoid
- Defective computer

Fault Code 37

1. Torque converter clutch solenoid circuit problem (open or short condition detected), or solenoid does not operate when commanded.
(Cars/Trucks/Vans 1988-97) (Diesel 1993-97) (Jeep 1996-97)

Overview
The torque converter clutch solenoid is part of the lock-up torque converter circuit. The lock-up torque converter circuit mechanically locks the engine to the automatic transmission so that engine output rotation is the same as transmission input rotation (one to one ratio), with no fluid slippage between the two. When the automatic transmission goes into lock-up mode, engine RPM drops and fuel consumption improves. The

computer monitors engine load (and other inputs) and, when appropriate, automatically places the transmission in lock-up mode by energizing the torque converter clutch solenoid. If a problem is detected in these circuits, the computer sets code 37.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages or grounds in circuit
- Defective clutch or internal transmission problems
- Defective solenoid
- Defective computer

2. Barometric read solenoid circuit problem (open or shorted).
(Turbo **ONLY**) (Cars 1983-89)

Overview
The barometric read solenoid switches the Manifold Absolute Pressure (MAP) sensor's vacuum source to read barometric (atmospheric) pressure under certain operating conditions. The barometric pressure reading from the MAP sensor is used by the computer for turbo boost control. The computer energizes the read solenoid during closed throttle or long periods of deceleration. If a problem develops in the solenoid circuit, the computer sets code 37.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Defective solenoid
- Defective computer

3. Transmission temperature sensor voltage out or range (too high or too low)
(Trucks/Vans/Diesel 1993-96)

Overview
The transmission temperature sensor is a temperature-controlled variable resistor (thermistor) which monitors transmission fluid temperature. The resistance of the sensor changes in direct proportion to the fluid temperature. The sensor is calibrated to operate within a specified voltage range, and the computer is calibrated to monitor the sensor within this range. If the sensor's signal voltage input to the computer is above or below it's operating range, the computer sets code 37.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Defective temperature sensor
- Defective computer

4. Park/Neutral switch circuit problem
(Cars 1995-97) (Trucks/Vans/Jeep/Diesel 1996-97)

Overview
The park/neutral switch interprets the position of the gear shift selector and sends this information to the computer. The computer uses this information to make adjustments in spark timing, idle speed, and some emission controls for the different gear shift selector positions (Park, Reverse, Neutral, etc.) If the computer detects a problem in this circuit, it sets code 37.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper adjustment of park/neutral switch
- Mechanical transmission problems
- Defective park/neutral switch
- Defective computer

5. Shift indicator lamp not turning "on" or "off" at proper time (manual transmission only)
(Cars 1983-87)

Overview
The shift indicator lamp provides a visual indication during vehicle operation of when to shift to the next higher gear to obtain maximum fuel economy. The computer controls this lamp based primarily on current engine speed and manifold vacuum. If the computer detects problems in the shift indicator lamp circuit, it sets code 37.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages or grounds
- Defective indicator lamp
- Defective computer

Fault Code 41

Alternator field control circuit problem
(Cars 1983-97) (Trucks/Vans 1987-97) (Jeeps/Diesel 1993-97)

Overview
The alternator generates the electricity necessary to charge the vehicle's battery. The alternator consists of a field coil (rotor) which rotates within a conductor (stator). When current is applied to the rotor, a magnetic field is created in and around the rotor, and electricity is generated within the stator to charge the battery. If current to the rotor is removed, the alternator stops charging. The computer controls the application of current to the rotor to keep the battery voltage between 12.9 and 15 volts. If battery voltage falls below 12.9 volts, the computer energizes the rotor, and the alternator charges the battery. If battery voltage rises above 15 volts, the computer de-energizes the rotor, and the alternator stops charging. If the field control circuit fails to switch on/off properly, the computer sets code 41.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Defective generator or alternator
- Defective computer

Fault Code 42

1. Automatic Shutdown (ASD) relay circuit problem
(Cars 1983-97) (Trucks/Vans 1987-97) (Diesel 1992-97) (Jeeps 1993-97)

Overview
The Automatic Shutdown (ASD) relay supplies power to the ignition coil, fuel pump (in most vehicles), fuel injectors, and oxygen sensor heater (if equipped). When the key is first turned on, the computer energizes the relay, causing the relay to close. If the computer does not receive an ignition reference signal within two seconds during engine cranking, it de-energizes (opens) the relay. If a problem is detected in the ASD relay circuit, the computer sets code 42.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors

- Defective ASD relay
- Defective computer

2. **Fuel level sending unit voltage out of range (too low or too high) or no change over miles travelled**
(Cars/Trucks/Vans/Jeeps 1996-97)

Overview
The fuel level sending unit is an electromechanical device inside the fuel tank which converts the fuel level into a voltage signal to monitor the amount of fuel in the fuel tank. The voltage signal varies in direct proportion to the amount of fuel in the fuel tank. This signal is sent to the computer and to the fuel gauge in the instrument panel. The computer also uses this information to perform a self-test of the Evaporative Emission Control (EVAP) system. If a problem is detected in the fuel level sending unit circuit, the computer sets code 42.

Probable Cause:
- Open or shorted wiring
- Dirty or loose connectors
- Voltage loss from ignition switch
- Defective fuel level sending unit
- Defective printed circuit board in instrument cluster
- Defective computer

3. **Fuel pump relay control circuit problem**
(Cars/Trucks/Vans/Jeeps 1996-97)

Overview
The fuel pump relay supplies voltage to operate the fuel pump. The computer energizes and de-energizes the relay to turn the fuel pump on and off. (On some models, the fuel pump relay is activated by the Automatic Shutdown (ASD) relay). If a problem is detected in the fuel pump relay circuit, the computer sets code 42.

Probable Causes:
- Dirty or loose connectors
- Open or shorted wiring
- Open (blown) fuse in ignition switch circuit
- Defective fuel pump relay
- Defective computer

Fault Code 43

Spark/ignition control circuit problem
(Cars 1983-88) (Trucks/Vans 1987-••)

Overview
The ignition system ignites the air/fuel mixture in the combustion chamber. For the best engine performance and least pollution, ignition must occur at the right time regardless of changes in engine load or vehicle speed. The system consists of a signal pulse generator assembly (inside the distributor), camshaft sensor or crankshaft sensor, ignition coil(s), primary and secondary ignition wiring, ignition module and/or computer. The signal pulse generator assembly generates a signal (based on engine RPM) that tells the ignition module (or computer) which cylinder is approaching its compression stroke and is ready for ignition. The ignition module or computer controls the operation of the ignition coil(s) to fire the spark plugs at the proper time. During the period of time the ignition coil is energized (dwell), the coil is saturated with electricity and a strong magnetic field is created inside the coil. When the coil is de-energized, the magnetic field inside the coil collapses, creating a high voltage strong enough to "jump" the spark plug gap. If the ignition coil does not respond properly to the ignition module (or computer), commands, the computer sets code 43.

Probable Cause:
- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages or grounds
- Defective ignition coil
- Defective ignition module
- Defective computer

Fault Code 44

1. **Battery temperature sensing voltage out of range (too high, or too low)**
(Cars 1985-97) (Trucks/Vans/Jeep/Diesel 1993-97)

Overview
The battery temperature sensor is a temperature controlled variable resistor (thermistor) which monitors battery temperature. The resistance of the sensor changes in direct proportion to battery temperature. The computer uses this

information to adjust the alternator's charging rate to compensate for air (ambient) temperature. (The battery requires a higher voltage charging rate at low temperature than at high temperature). The battery temperature sensor is calibrated to operate at a specified voltage range (typically 0.04 to 4.9 volts), and the computer is calibrated to monitor the sensor within this range. If the battery temperature sensor signal voltage input to the computer is above or below it's operating range, the computer sets code 44.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Defective battery temperature sensor
- Defective computer

2. **Loss of "ignition/fused J2 voltage sense" signal to computer.**
(Cars 1987-89)

Overview

The "ignition/fuse J2 voltage sense" circuit monitors the vehicle's system voltage. The computer uses this information to supply the engine with a richer air/fuel mixture (by increasing injector pulse width) to compensate for a low battery or low system voltage condition, and to adjust the charging system voltage to the proper value. If a fault is detected in the "ignition/fuse J2 voltage sense" circuit, the computer sets code 44.

Probable Causes

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages or grounds
- Defective alternator
- Defective computer

Fault Code 45

1. **Turbo boost monitoring circuit problem (boost limit exceeded)**
(Cars 1983-92)

Overview

The turbo boost monitoring system is part of the turbocharger system. The monitoring system prevents turbo boost pressure from exceeding a predetermined level. The monitoring circuit consists of a pressure sensor, wastegate solenoid, wastegate and actuator assembly. The computer monitors the pressure sensor, and based on this information, cycles the vacuum supply to the actuator assembly on and off. The mechanical action of the actuator opens the wastegate to divert exhaust gas around the turbocharger to limit boost pressure inside the intake manifold (see code 36 for more information). If a problem is detected in this circuit, the computer sets code 45.

Probable Cause:

- Leakage or restrictions in vacuum hoses
- Leaking wastegate solenoid
- Defective wastegate actuator

2. **Transmission overdrive solenoid circuit problem**
(Trucks/Vans 1990-95) (Diesel 1993-96)

Automatic transmission governor pressure circuit problem
(Cars/Trucks/Vans 1996-97)

Transmission temperature sensor circuit problem
(Trucks/Vans 1997)

Overdrive switch circuit problem
(Trucks/Vans 1996-97)

Transmission electronic controller circuit problem (EATX controller)
(Cars 1996-97) (Trucks/Vans 1996)

Transmission 3-4 shift solenoid problem or transmission relay circuit problems
(Trucks/Vans 1997)

Park/neutral position switch stuck in park or in gear
(Trucks/Vans 1997)

Overview

The computer monitors several sensors, solenoids, relays, and switches from the automatic transmission. It uses the information from these devices to control shift-pattern, gear position, and torque converter lock-up timing. Solenoids, relays, and switches are used to activate shifting or torque converter lock-up by switching or diverting transmission fluid, under pressure, to the proper passage in the valve body. The fluid pressure from the valve body is used to control the application of the friction components inside the transmission. The application of these components (clutches and bands) make it possible to transfer engine power in a controlled manner to the transmission to drive the vehicle. The computer also uses pressure and temperature sensors to monitor fluid pressure and temperature for the proper operation of the transmission. If a problem is detected in any of these circuits or components, the computer sets code 45.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages or grounds
- Defective relay, solenoid or switch
- Mechanical problem in transmission
- Defective computer

Fault Code 46

Battery voltage sensing circuit problem (voltage too high)
(Cars 1985-97) (Trucks/Vans 1986-97) (Diesel 1992-97) (Jeeps 1993-97)

Overview
The alternator supplies power to the vehicle's electrical/ electronic systems to charge the vehicle's battery. The computer must maintain the alternator's output (rate of charge) between 12.9 - 15 volts. To accomplish this, the computer monitors the temperature of the air surrounding the battery (the system requires higher voltage at low temperatures), the current voltage of the battery (battery voltage sense) and the alternator output (control voltage). The computer energizes and de-energizes the alternator, based on these inputs, to keep the battery charge within the acceptable range. The "battery voltage sense" signal must stay within one volt of the "control voltage". If the "battery voltage sense" signal is greater than one volt above the "control voltage", the computer sets code 46.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Loose or missing alternator belt
- Defective alternator
- Defective computer

Fault Code 47

Battery voltage sensing circuit problem (volts too low)
(Cars 1985-97) (Trucks/Vans 1986-97) (Diesel 1992-97) (Jeeps 1993-97)

Overview
The alternator supplies power to the vehicle's electrical/ electronic systems to charge the vehicle's battery. The computer must maintain the alternator's output (rate of charge) between 12.9 - 15 volts. To accomplish this, the computer monitors the temperature of the air surrounding the battery (the system requires higher voltage at low temperatures), the current voltage of the battery (battery voltage sense) and the alternator output (control voltage). The computer energizes and de-energizes the alternator, based on these inputs, to keep the battery charge within the acceptable range. The "battery voltage sense" signal must stay within one volt of the "control voltage". If the "battery voltage sense" signal is more than one volt below the "control voltage", the computer sets code 47.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Loose or defective alternator belt
- Defective alternator
- Defective computer

Fault Code 51

Oxygen sensor/fuel system lean condition indicated
(Cars 1983-97) (Trucks/Vans 1988-97)

Lean operation at wide open throttle position
(Flex fuel vehicles only)

Overview
The oxygen (O2) sensor monitors the vehicle's exhaust and generates a varying voltage signal of up to one (1) volt based on the amount of oxygen present in the exhaust gas. If the exhaust gas contains a large amount of oxygen (indicating a lean air/fuel mixture) the oxygen sensor generates a "low" voltage signal. If the exhaust gas contains very little oxygen (indicating a rich condition) the oxygen sensor generates a "high" voltage signal. A 450mV signal equates to the most efficient and least polluting (ideal) air/fuel ratio of 14.7 parts air to one part fuel.

The oxygen sensor must reach a temperature of 660°F before it produces a voltage signal, and the engine must reach operating temperature before the computer enters into closed loop operation. Some oxygen sensors are equipped with a heating element, which helps the sensor reach operating temperature

more quickly. A properly operating oxygen sensor reacts quickly to the amount of oxygen in the exhaust stream and sends the information to the computer. A faulty sensor reacts slowly, or its voltage signal is weak or missing. Early Chrysler vehicles are equipped with one or two oxygen sensors; later models have up to four sensors. If the oxygen sensor indicates a lean condition during engine operation, the computer sets code 51.

Probable Cause:

A problem in any of the following circuits could result in a lean condition:

- Ignition system - spark plugs, spark plug wires, ignition coil(s), ignition circuit wiring
- Fuel system - low fuel level, fuel pump, regulator, relay, plugged line, fuel filter, wiring
- Engine parts out of tolerance - worn or defective
- Injectors - plugged, defective, bad connectors, wiring
- Oxygen sensor - defective sensor, bad wiring, etc.
- Map sensor - defective sensor, circuit wiring, vacuum hose, etc.
- Exhaust system - leaking pipe, manifold, gaskets, etc.
- Computer - defective computer

Fault Code 52

1. Problem in logic module (computer)
(Cars 1983-88)

Overview

The computer is the heart of the engine management system. It oversees and adjusts engine operation to provide best performance with the least amount of air pollution. The computer's memory stores predetermined "reference" values for air/fuel ratio, spark and injection timing, injector pulse width, engine speed, etc., for all possible driving conditions. The computer receives inputs from sensors located throughout the engine which monitor critical operating parameters (coolant temperature, engine speed, engine load, throttle position, air/fuel ratio), and compares the "actual" values from these sensors with the programmed reference values. If the sensor input values do not match the "reference" values for that particular driving condition, the computer will command the proper components (actuators) to make corrections. All sensor and actuator circuits are programmed within the computer to operate within a specified voltage level or range. The computer continuously monitors all the sensors, actuators, switches, and on later model vehicles, it periodically performs tests of each circuit. If the computer detects an out of range signal, no signal, or a circuit test failure, it assigns a code number and stores it in it's memory. On emission related codes, a "malfunction indicator light" or "check engine" light will also illuminate to warn the operator of a fault in the system. If the computer detects a problem in its internal circuits, it sets code 52.

Probable Cause:

- Defective computer - Additional computer circuit tests should be performed before replacing the vehicle's computer. Professional help is strongly recommended.

2. Oxygen sensor/fuel system rich condition indicated
(Cars 1984-97) (Trucks/Vans 1988-97)

Overview

The oxygen (O2) sensor monitors the vehicle's exhaust and generates a varying voltage signal of up to one (1) volt based on the amount of oxygen present in the exhaust gas. If the exhaust gas contains a large amount of oxygen (indicating a lean air/fuel mixture) the oxygen sensor generates a "low" voltage signal. If the exhaust gas contains very little oxygen (indicating a rich condition) the oxygen sensor generates a "high" voltage signal. A 450mV signal equates to the most efficient and least polluting (ideal) air/fuel ratio of 14.7 parts air to one part fuel.

The oxygen sensor must reach a temperature of 660°F before it produces a voltage signal, and the engine must reach operating temperature before the computer enters into closed loop operation. Some oxygen sensors are equipped with a heating element, which helps the sensor reach operating temperature more quickly. A properly operating oxygen sensor reacts quickly to the amount of oxygen in the exhaust stream and sends the information to the computer. A faulty sensor reacts slowly, or its voltage signal is weak or missing. Early Chrysler vehicles are equipped with one or two oxygen sensors; later models have up to four sensors. If the oxygen sensor indicates a rich condition during engine operation, the computer sets code 52.

Probable Cause:

A problem in any of the following circuits could result in a rich condition:

- Ignition system - ignition coil(s), spark plugs, plug wires, circuit wiring
- Fuel system - fuel pump, regulator

- Engine parts out of tolerance - worn or defective
- Injectors - leaking, defective, bad connectors, wiring
- Oxygen sensor - defective sensor, bad wiring, etc.
- Map sensor - defective sensor, circuit wiring, vacuum hose etc.
- Exhaust system - plugged pipe, manifold, etc.
- Computer - defective computer, computer circuit
- Failed catalytic converter
- Coolant system - defective sensor, thermostat

Fault Code 53

Internal computer problem (SMEC, SBEC/PCM) detected
(Cars 1983-97) (Trucks/Vans 1987-97) (Jeeps/Diesel 1993-97)

Overview

The computer is the heart of the engine management system. It oversees and adjusts engine operation to provide best performance with the least amount of air pollution. The computer's memory stores predetermined "reference" values for air/fuel ratio, spark and injection timing, injector pulse width, engine speed, etc., for all possible driving conditions. The computer receives inputs from sensors located throughout the engine which monitor critical operating parameters (coolant temperature, engine speed, engine load, throttle position, air/fuel ratio), and compares the "actual" values from these sensors with the programmed reference values. If the sensor input values do not match the "reference" values for that particular driving condition, the computer will command the proper components (actuators) to make corrections. All sensor and actuator circuits are programmed within the computer to operate within a specified voltage level or range. The computer continuously monitors all the sensors, actuators, switches, and on later model vehicles, it periodically performs tests of each circuit. If the computer detects an out of range signal, no signal, or a circuit test failure, it assigns a code number and stores it in its memory. On emission related codes, a "malfunction indicator light" or "check engine" light will also illuminate to warn the operator of a fault in the system. If the computer detects a problem in its internal circuits, it sets code 53.

Probable Cause:

- Defective computer - Additional computer circuit tests should be performed before replacing the vehicle's computer. Professional help is strongly recommended.

Fault Code 54

Sync pick-up circuit problem
(Cars 1983-92) (Trucks/Vans 1987-92)

No camshaft sync signal detected at PCM
(Cars/Trucks/Vans/Jeeps 1993-97)

Overview

Most Chrysler vehicles use one of two types of devices to generate a synchronizing (sync) signal. A Hall-effect sensor (used on most vehicles), is mounted inside the distributor (if equipped) or is mounted on the front of the engine and is used as a camshaft position sensor on Direct Ignition Systems (DIS). A distributor-mounted optical type system is used only on 3.0L V-6 Mitsubishi engines. The sync-signal is used by the computer to detect camshaft position and determine which cylinder is coming up on its compression stroke or when the #1 cylinder is at top dead center (TDC) position. The computer uses this information to synchronize fuel injection and spark timing. On some vehicles, the signal is used only during start-up (cranking). On other vehicles, the signal is used both during start up and when the engine is running. On the optical system, this signal is monitored only during start-up and at engine speeds up to 1200 RPM. On Direct Ignition Systems (DIS), the camshaft position sensor signal is used only during start up. If a problem is detected in the sync-signal circuit, the computer sets code 54.

Probable Cause:

- Dirty or loose connectors
- Open or shorted sync-circuit
- Excessive clearance between the sensor and sprocket; defective sprocket (if equipped)
- Blown fuse on ignition switch output circuit (some systems)
- Defective distributor (if equipped)
- Defective camshaft position sensor (if equipped)
- Defective Hall-effect sensor or optical sensor (if equipped)
- Defective computer

Fault Code 55

Completion of fault codes displayed by blinking lamp

Overview

Code 55 represents the end of the self-diagnostic test mode. This code will appear as the final code after all other fault codes have been displayed.

Probable Cause:

None

Fault Code 61

1. Barometric read solenoid circuit problem

(Cars/Trucks/Vans 1989 and later, turbo only)

Overview

The barometric read solenoid switches the Manifold Absolute Pressure (MAP) sensor's vacuum source to read barometric (atmospheric) pressure under certain operating conditions. The barometric pressure reading from the MAP sensor is used by the computer for turbo boost control. The computer energizes the read solenoid during closed throttle or long periods of deceleration. If a problem develops in the solenoid circuit, the computer sets code 61.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Improper voltages and grounds
- Defective solenoid
- Defective computer

2. Barometric pressure out of range (too high or too low)

(Cars/Vans 1996-97)

Overview

The Manifold Absolute Pressure (MAP) sensor monitors barometric (atmospheric) pressure in the intake manifold. The computer uses this reading as an altitude reference, and to determine air/fuel mixture adjustments. The computer monitors the MAP sensor signal when the ignition key is on and engine speed is less than 255 RPM. The MAP sensor is calibrated to operate within a specific voltage range (when barometric pressure is being monitored) and the computer is programmed to monitor the MAP sensor within this range. If the signal voltage input to the computer is below or above it's operating range, the computer sets code 61.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Defective MAP sensor
- Defective computer (PCM)

Fault Code 62

Attempt to update the mileage inside the computer for the emissions maintenance reminder (EMR) or service reminder indicators (SRI) has failed

(Cars/Trucks/Vans 1989-97) (Diesel/Jeeps 1993-97)

Overview

The computer has an internal program for emission maintenance reminder (EMR) or service reminder indicator (SRI) operation. This program turns on an instrument panel light at a pre-determined mileage (typically every 30,000 miles) as a reminder that the emission system needs service. When this light turns on, take the vehicle to a professional to service the emission system and to update or reset the mileage in the computer (a Scan Tool is needed to perform this procedure). If the computer is unable to update the mileage for the EMR or SRI memory, the computer sets code 62.

Probable Cause:

- Defective computer - Additional computer circuit tests should be performed before replacing the vehicle's computer. Professional help is strongly recommended.

Fault Code 63

PCM failure; EEPROM write denied (an attempt to write to an EEPROM location inside the computer has failed)

(Cars/Trucks/Vans 1989-97) (Diesel 1992-97) (Jeeps 1993-97)

Overview

The computer has an internal program for emission maintenance reminder (EMR) or service reminder indicator (SRI) operation. This program turns on an instrument panel light at a pre-determined mileage (typically every 30,000 miles) as a reminder that the emission system needs service. When this light turns on, take the vehicle to a professional to service

the emission system and to update or reset the mileage in the computer (a Scan Tool is needed to perform this procedure). If the computer is unable to update the mileage for the EMR or SRI memory, the computer sets code 63.

Probable Cause:

- Defective computer - Additional computer circuit tests should be performed before replacing the vehicle's computer. Professional help is strongly recommended.

Fault Code 64

1. **Speed control vent solenoid circuit problem**
(Cars 1990-92)

Overview

The computer controls operation of the speed control in response to operator commands. The speed control operating range is 35-85 MPH. When the speed control switch is turned on, the computer energizes a vacuum solenoid to hold the throttle at the set speed. The computer also uses the Vehicle Speed Sensor (VSS) signal input as a reference to keep the speed control at the desired speed. If the brake is applied or the speed control switch is turned off, the computer energizes a vent solenoid to disengage the speed control. The servo gets its power from a relay through the brake switch. If a problem is detected in the vent solenoid circuit, the computer sets code 64.

Probable Cause:

- Open or shorted wiring
- Dirty or loose connectors
- Defective solenoid
- Defective computer

2. **Flex fuel sensor voltage out of range (too high or too low) or loss of calibration signal**
(Cars/Trucks/Vans 1993-97)

Overview

Flex fuel systems are capable of using gasoline, methanol, or a combination of both types of fuel. The system uses a sensor to determine the percentage of methanol in a gasoline/methanol fuel mixture. The sensor sends a voltage signal input (0.5 to 4.5 volts) to the computer, representing the methanol content of the fuel (0.5 volts = 0% methanol, 4.5 volts = 85% methanol). The computer also checks the sensor's calibration for two seconds when the ignition key is first turned on (the sensor output must be 4.5 volts). If the signal voltage rises above or falls below it's operating range, or if the calibration voltage is not 4.5 volts, the computer sets code 64.

Probable Cause:

- Dirty or loose connections
- Open or shorted sensor signal circuit
- Open or shorted supply circuit
- Defective flex fuel sensor
- Defective computer

3. **Compress natural gas fuel temperature sensor voltage signal out of range (too high or too low)**
(Cars/Trucks/Vans 1994-97)

Overview

The compress natural gas (CNG) fuel temperature sensor is a temperature-controlled variable resistor (thermistor) which monitors natural gas temperature, and provides a voltage signal input to the computer. When the fuel is cold, the voltage signal is high. As fuel temperature increases, the voltage signal decreases proportionally. The sensor is calibrated to operate within a specific voltage range (from 0.49 to 4.96 volts), and the computer is programmed to monitor the sensor within this range. If the sensor's signal voltage input to the computer is above or below it's operating range, the computer sets code 64.

Probable Cause:

- Dirty or loose connectors
- Open or shorted signal circuit
- Bad grounds in circuit
- Defective sensor
- Defective computer

4. **CNG pressure sensor voltage too high or voltage too low**
Cars (1994-97)

Overview

The compressed natural gas (CNG) pressure sensor monitors fuel pressure at the fuel rail and provides a voltage signal input to the computer. When fuel pressure is low, the voltage signal is high. As fuel pressure increases, the voltage signal decreases proportionally. The sensor is calibrated to operate within a specific voltage range (from 0.49 to 4.96 volts), and the computer is programmed to monitor the sensor within this range. If the sensor's signal voltage input to the computer is above or below it's operating range, the computer sets code 64.

Probable Cause:

- Dirty or loose connectors
- Open or shorted signal circuit
- Open sensor 5 volt supply circuit
- Defective sensor
- Defective computer

5. Catalytic converter efficiency failure
(Cars/Trucks/Vans/Jeeps 1996-97)

Overview
The catalytic converter is a device that is installed downstream of the exhaust manifold to help oxidize (burn) the unburned fuel (hydrocarbons - HC) and partially burned fuel (carbon monoxide - CO) leftover from the combustion process. To accomplish this, heat (about 600° F) and catalyst materials (platinum, palladium, rhodium) inside the converter react with the exhaust gases to oxidize (burn) HC and CO, and in the process, it 'converts' these polluting gases into non polluting or less polluting gases, carbon dioxide (CO2) and water (H20). Some catalytic converters also reduce the oxides of nitrogen (NOX) by converting them to less polluting gases (NOX reacts with CO to form N2, CO2, and 02). Some materials (alumina or cerium) inside the catalytic converter have the ability to store oxygen (O2) and then releases it as needed to oxidize HC and CO. The computer checks the efficiency of the catalytic converter by monitoring each converter with two (2) oxygen sensors, one (1) before (upstream) the converter and one (1) after (downstream) the converter. If the catalytic converter loses its ability to store oxygen, the downstream oxygen sensor signal becomes identical to the upstream oxygen sensor and the computer will set Fault Code 64.

Probable Cause:

- Contaminated fuel
- Exhaust leak upstream of converter
- Mechanical engine problem
- Defective catalytic converter

Fault Code 65

1. Speed control vent solenoid circuit problem
(Cars 1990-91)

Overview
The computer controls the function of the speed control as the vehicle operator commands. The operating range of the speed control is between 35-85 MPH. When the operator turns the speed control "on", the computer energizes the "vacuum solenoid" to hold the throttle to the set speed. If the operator steps on the brakes or turns the speed control "off", the computer energizes a vent solenoid to disengage the speed control. The servo gets its power from a relay through the brake switch. The computer also needs the vehicle speed sensor signal (VSS) input for reference to keep the speed control at the desired vehicle speed. If a problem develops in the vent solenoid circuit, the computer will set Fault Code 65.

Probable Cause:

- Dirty, loose, or defective connectors in solenoid circuits
- Shorts or open in solenoid or control circuit wiring
- Defective solenoid
- Defective computer

2. Brake switch sense circuit problem
(Cars 1996-97)

Overview
The signal from the brake switch is used by the computer to help it manage various systems. The computer uses it to disengage the speed control, disable part throttle unlock on 3 speed automatic transmissions, disables speed sensor diagnostics, enable (starts) purge monitor (test) or EVAP system, and to modify stall torque management control. If the computer does not see the proper signal when the brakes are applied or when the brake pedal is relaxed, it will set Fault Code 65.

Probable Cause:

- Dirty, loose, or defective connectors
- Wiring- opens or shorts in circuit
- Brake switch out of alignment
- Defective brake switch

3. Power steering switch failure
(Cars/Trucks/Vans/Jeeps/Diesel 1996-97)

Overview
The computer keeps track of the pressure in the power steering system by monitoring the power steering pressure switch. If the computer does not receive an input signal from this switch, it will set Fault Code 65.

Probable Cause:

- Dirty, loose, or defective connectors
- Wiring- shorts or opens in circuit
- Defective pressure switch
- Defective computer

4. **Manifold tune valve solenoid circuit problem**
(Cars/Trucks/Vans/Jeeps 1996-97)

Overview
The manifold tune valve (MTV) solenoid is controlled by the computer. The computer activates this solenoid at wide-open throttle and at engine speeds below 3008 RPM. The solenoid activates an intake manifold mounted servo to power tune the manifold. If the solenoid is not responding properly to the computer commands, the computer will set Fault Code 65.

Probable Cause:

- Blown fuse in power circuit
- Dirty, loose, or defective connectors or wires
- Opens or shorts in circuit
- Defective MTV solenoid
- Defective computer

Fault Code 66

1. **No CCD message from body control module (BCM)**
(Cars 1993-97) (Trucks/Vans 1996-97)

Overview
The powertrain control module (PCM) and the body control module (BCM) communicate continuously anytime the ignition key is "on". They share information back and forth through a CCD bus (harness). They need this information to properly operate their respective systems. If the PCM does not receive data from the BCM, it will set Fault Code 66.

Probable Cause:

- Open CCD bus (+) or (-) circuits between the PCM and RCM.
- BCM not powered up
- Defective BCM
- Defective PCM

2. **No CCD messages from transmission control unit (TCM)**
(Cars/Trucks/Vans 1996-97)

Overview
The powertrain control module (PCM) and the transmission control module (TCM) communicate continuously when the engine is running. They share information back and forth through a CCD, bus (+) and harness (-) system. They need this information to properly operate their respective systems. If the PCM does not receive information from the TCM, it will set Fault Code 66.

Probable Cause:

- Open CCD bus (+) or (-) circuits between PCM and TCM
- No power at TCM
- Defective TCM
- Defective PCM

Fault Code 71

5 volt supply output too low
(Cars/Trucks/Vans 1996-97)

Overview
The computer maintains a 5 volt supply reference voltage to the manifold absolute pressure (MAP), throttle position sensor (TP), and the air conditioning (A/C) pressure sensor. Because the sensor's voltage output signal depends on the 5 volt supply, its accuracy is critical to proper operation of these sensors. The computer must keep this voltage between 4.8-5.1 volts. If the supply voltage falls below 4.8 volts, the computer will set Fault Code 71.

Probable Cause:

- Dirty, loose, or defective wiring or connectors
- Short in 5 volt supply circuit
- Defective MAP, TP, or A/C pressure sensor
- Defective computer

Fault Code 72

Catalytic converter efficiency failure
(Cars/Trucks/Vans/Jeeps 1996-97)

Overview
The catalytic converter is a device that is installed downstream of the exhaust manifold to help oxidize (burn) the unburned fuel (hydrocarbons - HC) and partially burned fuel (carbon monoxide - CO) leftover from the combustion process. To accomplish this, heat (about 600°F) and catalyst materials (platinum, palladium,

rhodium) inside the converter react with the exhaust gases to oxidize (burn) HC and CO, and in the process, it "converts" these polluting gases into non polluting or less polluting gases, carbon dioxide (CO2) and water (H20). Some catalytic converters also reduce the oxides of nitrogen (NOx) by converting them to less polluting gases (NOX reacts with CO to form N2, CO2, and 02). Some materials (alumina or cerium) inside the catalytic converter have the ability to store oxygen (02) and then releases it as needed to oxidize HC and CO. The computer checks the efficiency of the catalytic converter by monitoring each converter with two (2) oxygen sensors, one (1) before (upstream) the converter and one (1) after (downstream) the converter. If the catalytic converter loses its ability to store oxygen, the downstream oxygen sensor signal becomes identical to the upstream oxygen sensor and the computer will set Fault Code 72.

Probable Cause:

- Contaminated fuel
- Exhaust leak upstream of converter
- Mechanical engine problem
- Defective catalytic converter

Fault Code 77

Speed control power relay circuit problem
(Cars 1991-97) (Trucks/Vans/Jeeps 1997)

Overview

The computer controls the power to the speed control through a power relay. If the computer detects a problem (short or open) in the power supply relay circuit, it will set Fault Code 77. See Code 64 for more speed control information.

Probable Cause:

- Dirty, loose, or defective connectors and wiring
- Opens or shorts in power supply circuit
- Defective power supply solenoid
- Defective speed control servo

3.1 INTRODUCTION

This Glossary contains definitions for abbreviations and terms you may find in this manual or in your vehicle's repair manual.

3.2 GLOSSARY OF TERMS AND ABBREVIATIONS

AC (ALTERNATING CURRENT) – An electrical current which alternates it's direction of flow at regular intervals.

A/C CLUTCH SWITCH – Device which sends a signal to the vehicle's on-board computer to prevent engine idle speed from varying when the compressor clutch cycles. The computer activates the AIS motor to give a one-time increase in engine speed when the A/C clutch engages.

A/C CUT-OUT RELAY – Device which operates under control of the vehicle's on-board computer to prevent compressor clutch engagement under wide open throttle conditions.

A/C SWITCH – Device which sends a signal to the vehicle's on-board computer to indicate the air conditioner is operating. The computer increases engine speed to compensate for the additional load. (This signal was not used on 1984-85 EFI models).

ACTUATION TEST MODE (ATM) – The diagnostic mode used by the vehicle's on-board computer to activate and deactivate specific output circuits to determine if they are operating properly. Outputs of this test mode are displayed as 2-digit ATM codes which identify malfunctions to a specific circuit.

ACTUATOR – A device that moves or controls another device in response to a mechanical, hydraulic, pneumatic, or electrical input.

A-D (ANALOG-DIGITAL) CONVERTER – An electronic circuit which converts an analog input to a digital output.

AICV (AIR INJECTION CHECK VALVE) – One-way check valve which prevents hot exhaust gases from backing up in the hose and air pump in the event of air pump belt failure, abnormally high exhaust system pressure, or if the air hose ruptures.

AIR/FUEL (AF) MIXTURE – A ratio of the amount of air that is mixed with fuel before it is burned in the combustion chamber.

AIR GAP – The space between the spark plug electrodes, motor and generator armatures, field shoes, etc.

AIR CHARGE TEMPERATURE SENSOR – A thermistor (temperature-controlled variable resistor located in the intake manifold.

AIR CLEANER VACUUM DIAPHRAGM – A diaphragm, controlled by the air temperature sensor, which controls the position of the door in the air cleaner duct to allow warm or cold air into the carburetor.

AIR RELIEF VALVE (ARV) – Device which vents excess air pump output into the engine compartment when a specified discharge pressure is reached.

AIR SWITCHING/RELIEF VALVE (ASRV) – The ASRV directs air injection to the exhaust port or downstream injection port, depending on engine operating temperature, and regulates system pressure by controlling air pump output at high engine speeds (when pressure reaches a predetermined level, some of the air pump output is vented to atmosphere. Initially air injection is directed to the exhaust ports; as the engine reaches normal operating temperature, air injection is directed to the downstream injection port for proper system operation.

AIS (AUTOMATIC IDLE SPEED) MOTOR – Increases or decreases the size of an idle air bypass to raise or lower idle speed. The AIS motor is mounted on the throttle body assembly and is controlled by the vehicle's on-board computer.

AMBIENT TEMPERATURE – Temperature of air surrounding an object.

AMMETER – A device which measures current in an electrical circuit.

AMPERAGE – The total amount of current flow in a circuit.

AMPERE – A unit of measurement to determine the current (flow of electrons) in a circuit.

AMPLIFIER – An electronic device (usually a vacuum tube or transistor) used in a circuit to increase voltage or current.

AMPLITUDE – The maximum rise and fall of a voltage signal from its average value.

ANALOG – A method of transmitting information by varying a voltage or current.

ANALOG-DIGITAL (A-D) CONVERTER – An electronic circuit which converts an analog input to a digital output.

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ANALOG CONTROLS – Circuits which process and/or transmit information by varying a current or voltage.

ANALOG VOLT-OHMMETER (VOM) – A device which measures voltage and resistance in an electrical circuit. Readings are displayed by a meter movement (instead of a digital display).

ARMATURE – The moveable part of an electromagnetic device; the rotating part of a generator or motor.

ASD (AUTOMATIC SHUT-DOWN) RELAY – Operates under control of the vehicle's on-board computer to supply voltage to the in-tank fuel pump, ignition coil and fuel injectors during engine cranking.

ATDC (AFTER TOP DEAD CENTER) – Refers to crankshaft position relative to the ignition timing in degrees.

ATMOSPHERIC PRESSURE – The pressure caused by the weight of the earth's atmosphere; equal to approximately 14.69 psi at sea level.

ATOMIZATION – To reduce a liquid to a fine spray.

AVAILABLE VOLTAGE – The amount of voltage measured at the voltage source, or other point in a circuit, with respect to ground.

B + – The voltage or potential of the battery positive terminal.

BAROMETRIC (BARO) READ SOLENOID – The BARO read solenoid is a solenoid located in the MAP sensor vacuum line and provides an indication of barometric pressure (on turbocharged vehicles) to the vehicle's on-board computer for boost control.

BATTERY – A group of two or more chemical cells connected together for the production of an electric current.

BATTERY-HOT – Describes a circuit which receives input voltage directly from the starter relay terminal. Voltage is available whenever the battery is charged.

BATTERY TEMPERATURE SENSOR – The sensor is a 10K ohm thermistor (temperature-controlled variable resistor), located in the vehicle's on-board computer, which controls charging system voltage according to battery temperature (resistance decreases as temperature increases).

BATTERY VOLTAGE – The voltage measured between the two terminals of a battery.

BEFORE TOP DEAD CENTER (BTDC) – Refers to crankshaft position relative to the ignition timing in degrees.

BIMETAL – A contact arm made of two dissimilar metals, each having a different expansion rate. Heat causes bending movement of the arm to make or break a circuit.

BLOWN – Describes an open (melted) fuse filament, caused by excessive current draw.

BRAKE SWITCH – Device which provides a signal to the vehicle's on-board computer to determine idle throttle position (in the event the electronic idle switch malfunctions).

CALIBRATION – The act of adjusting or verifying test instrument accuracy in relation to the graduations used on the instrument.

CANISTER – A charcoal-filled container in an evaporative emission control system which traps vapors from the fuel system.

CANISTER PURGE CONTROL VALVE (CPCV) – A vacuum-operated valve which controls the flow of vapors from the canister to the engine. At engine temperatures below 145°F (61°C), the vehicle's on-board computer de-energizes the solenoid to allow vacuum to flow to the purge valve; the valve then purges fuel vapors through the throttle body.

CANISTER PURGE SOLENOID (CPS) – Electrical solenoid which opens the valve from the fuel vapor canister line to the intake manifold when de-energized.

CAPACITANCE – The property of a condenser (capacitor) which enables it to hold an electric charge.

CAPACITOR – A device capable of storing an electric charge.

CAPACITY – The amount of electricity which can be delivered, under specific conditions, at a given rate of discharge. Capacity is generally specified in amp-hours.

CCC (COMBUSTION CONTROL COMPUTER) – A computer control system used on 1981-83 Imperial models with electronic fuel injection to control fuel injection, spark timing and advance, idle speed, air injection switching, and fuel evaporation purging.

CCD BUS – A communication line used by various on–board computers for the transmission of data.

CDR – Chrysler Diagnostic Read-Out.

CHARGE – Any condition where electricity is available. Also describes the process of restoring the active materials in a battery cell by electrically reversing the chemical action.

CHARGE TEMPERATURE SENSOR – A thermistor (temperature-controlled variable resistor) which provides varying voltage signals, in proportion to intake manifold air temperature, to the vehicle's on-board computer. The computer uses this signal to control the air switching, EGR and spark advance systems.

CHARGE TEMPERATURE SWITCH – An "ON-OFF" switch which controls EGR flow (closed = no flow permitted, open = flow permitted).

CHARGING VOLTAGE – The voltage present at the alternator output.

CHECK ENGINE LIGHT – Instrument panel light used either to aid in identification and diagnosis of malfunctions, or to indicate maintenance is required.

CHECK VALVE – A one-way valve which allows vacuum or gas flow in one direction only.

CIRCUIT – An arrangement of conductors and components through which current can flow.

CIRCUIT BREAKER – A device (other than a fuse) which interrupts current flow in a circuit under abnormal conditions.

CLOSED CIRCUIT – An uninterrupted path beginning at the current source and returning to the current source.

CLOSED LOOP – A circuit in which the output of an electronic control is measured by a sensor and is returned to the control to indicate if the output is optimum or excessive.

COC (CONVENTIONAL OXIDATION CATALYST) – Component of an emission control system which acts on the pollutants HC and CO.

COMMON POINT – A terminal or connection where two parallel circuits or components are joined.

CONDENSER – A device capable of storing an electric charge.

CONDUCTOR – Any material or substance (solid, liquid or gas) capable of transmitting electricity.

CONNECTOR – A mechanical device used to connect the components of an electrical circuit together.

CONTINUITY – A condition where a circuit, or part of a circuit is closed or continuous between given points.

CONTROLLER – Generic name for an on-board solid state microcomputer which monitors engine conditions and controls certain engine functions. Specific computers such as ECU, Power Module, Logic Module, SBEC and SMEC are generically referred to as controllers.

COOLANT TEMPERATURE SENSOR (CTS) – A thermistor (temperature-controlled variable resistor) which provides varying voltage, in proportion to engine coolant temperature, to the vehicle's on-board computer.

COOLANT TEMPERATURE SWITCH – An "ON-OFF" switch which measures the engine coolant temperature and transmits the information on to the vehicle's on-board computer. The coolant temperature switch is closed when engine coolant is cold.

COOLANT VACUUM SWITCH COLD OPEN (CVSCO) – A switch mounted in the thermostat housing, which opens when coolant temperature is cold, to allow manifold vacuum into the air delivery switching system. The switch closes when coolant temperature is warm, to prevent manifold vacuum from entering the air delivery switching system.

COOLANT VACUUM SWITCH COLD CLOSED (CVSCC) – A switch mounted in the thermostat housing, which closes when coolant temperature is cold, to prevent EGR flow. The switch opens when coolant temperature is warm, to allow EGR flow.

CORE – The center conductor part of a wire, or the iron magnetic material of a solenoid magnet.

CROSS-CIRCUIT SHORT – A current flow path between the hot wires in two different circuits.

CURRENT – The movement of electrons through a conductor material.

CURRENT-LIMITING RESISTOR – A resistor in a circuit to which limits the current.

CYCLE – A complete alternation in an alternating current.

DEAD SHORT – A short circuit having zero resistance.

DE-ENERGIZED – The condition of an electrical circuit having the electric current or energy source turned off.

DETONATION (KNOCK) SENSOR – A piezoelectric device which responds to spark knock (caused by over-advanced ignition timing) and transmits this information to the vehicle's on-board computer. The computer uses this signal to retard ignition timing during knock conditions.

DIAGNOSTIC MODE – The mode of operation used by the vehicle's on-board computer to transmit Fault Codes (representing vehicle malfunctions). The computer retains Fault Codes for malfunctions which have occurred in the last 50 ignition cycles.

DIAGNOSTIC READ-OUT BOX (DRB) – The Chrysler Motors tester used to diagnose the on-board computer system. The DRB displays specific values in various modes, and displays Fault Codes, to assist the technician in diagnosing and correcting vehicle malfunctions.

DIAPHRAGM – A mechanical component which moves a control lever when a vacuum signal is applied.

DIELECTRIC – The insulating material used between the plates of a capacitor or condenser.

DIGITAL CONTROLS – Circuits which process and/or transmit information by switching current on and off.

DIGITAL VOLT-OHMMETER (DVOM) – A device which measures voltage and resistance in an electrical circuit. Readings are displayed in digital form on a liquid crystal display (LCD).

DIODE – An electronic component which allows current flow in one direction and insulates (blocks current flow) in the opposite direction.

DIRECT CURRENT (DC) – Electrical current which flows in one direction only.

DIRECT IGNITION SYSTEM (DIS) – Produces ignition spark without the aid of an ignition distributor.

DISTANCE (SPEED) SENSOR – Sensor is mounted at the transaxle tailshaft housing which transmits a signal representing vehicle speed to the vehicle's on-board computer.

DISTRIBUTOR – A device which directs secondary current from the induction coil to the spark plugs of a multi-cylinder engine, in proper firing order.

DRAW – The amount of electric current used by a load or circuit.

DRIVER – A transistor used to open and close the ground circuit of an output device (solenoid, relay, etc.)

DUTY CYCLE – The percentage of time that the vehicle's on-board computer energizes a solenoid.

DVOM (HIGH IMPEDANCE DIGITAL VOLT-OHMMETER) – This voltmeter has high opposition to the flow of electrical current, making it ideal for electrical measurements in circuits with low current flow (such as those found in electronic systems).

DWELL – The amount of time, in degrees, that current flows through a circuit.

EBL (ELECTRONIC BACKLITE) – Refers to the heated rear window system on Chrysler Motors vehicles. The signal from this system is used by the vehicle's on-board computer to increase engine idle speed when the heated rear window system is operating.

ECS (ENGINE CONTROL SYSTEM) – A computer control system first used on 2.2L electronic throttle body fuel injected (TBI) vehicles to control fuel, ignition, and emission control systems through six sub-systems.

EFC (ELECTRONIC FUEL CONTROL) – A computer control system was introduced on 1981 front wheel drive vehicles to control fuel and ignition systems through six sub-systems.

EFI (ELECTRONIC FUEL INJECTION) – A computer-controlled, multi-point, direct fuel injection system.

EGR (EXHAUST GAS RECIRCULATION) – A procedure in which inert exhaust gases are recirculated to the combustion chamber to cool combustion temperatures and reduce nitrous oxides in exhaust.

ELB (ELECTRONIC LEAN BURN) – An electronic ignition system designed to control ignition timing by firing an extremely lean air/fuel mixture.

ELECTRIC FUEL PUMPS – Two electric fuel pump systems are used by Chrysler Motors vehicles: a high-pressure in-tank pump is used for certain high-pressure fuel injection systems, and a low-pressure in-tank pump is used for low-pressure fuel injection systems.

ELECTROMAGNETIC – A device which utilizes electronic and magnetic principles in its composition and operation.

ELECTROMECHANICAL – A device which utilizes electronic and mechanical principles in its composition and operation.

ELECTRONIC – Term used to describe an arrangement of conductors, semiconductors, and other components which accomplishes the control of system or devices through the use of electrical signals.

ELECTRONIC SPARK ADVANCE (ESA) – An electronic ignition system, under control of the vehicle's on-board computer, which controls ignition timing and spark advance.

ELECTRONIC SPARK CONTROL (ESC) – A redesigned version of the ELB electronic ignition system.

ENERGIZED – The condition of an electrical circuit having the electric current or source turned on.

ENGINE RUNNING TEST MODE – The diagnostic mode used to read the output signals of specific sensors to the vehicle's on-board computer when the engine is idling. A SCAN Tool must be used during this test. The SCAN Tool displays the current operating condition of specific sensors and switches (Fault Codes are not generated during this test).

EXHAUST HEAT CONTROL VALVE – A valve which routes hot exhaust gases to the intake manifold heat riser during cold engine operation. The valve is controlled either by a thermostat or by engine vacuum.

FAULT CODES – A series of two-digit numbers, stored in the vehicle's on-board computer, which represent the results of On-Board Diagnostics or Vehicle Diagnostics. The computer transmits this information, via the Diagnostic Connector, as a series of pulses read either on a SCAN Tool, or as flashes of the "Power Loss/Check Engine" light on the vehicle's instrument panel.

FCS (FEEDBACK CONTROL SOLENOID) – Controls the introduction of filtered fresh air into the idle and main system bleed passages of the carburetor.

FCS (FUEL CONTROL SOLENOID) – Device which controls the carburetor air/fuel ratio. The FCS can be either a pulsating duty-cycle solenoid which bleeds air into the main and idle fuel systems, or a combined duty-cycle solenoid and vacuum regulator which controls fuel flow in the main fuel system and bleeds air into the idle fuel system.

FEED CIRCUIT – The power supply or hot wire.

FERROMAGNETIC MATERIAL – Any material with high magnetic permeability and high residual magnetism.

FLUX LINES – The lines of magnetic force (also referred to as Maxwells).

FUEL PUMP RELAY – Provides power to the electric fuel pump in TBI/EFI systems. The relay is either controlled by, or is an integral part of, the ASD relay.

FREQUENCY – The number of cycles-per-second (complete alternations) of an alternating current.

FUEL - RICH, LEAN – An evaluation of the air/fuel ratio based on the input received from the oxygen sensor. An air/fuel mixture with an excessive amount of oxygen is referred to as "lean"; an air/fuel mixture with an insufficient amount of oxygen is referred to as "rich".

FUEL-VACUUM SEPARATOR – A filtering device which protects the vacuum delay and distributor vacuum controls by removing hydrocarbons from carburetor-ported vacuum.

FUSE – A mechanical device which contains a soft piece of metal which opens (melts) and breaks the circuit during high current (overload) conditions.

FUSIBLE LINK – A device which protects a circuit from damage if a short to ground occurs, or if the polarity of the battery (or charger) is reversed.

GENERATE – To produce electricity by the process of electromagnetic induction.

GROUND (OR GND) – In automotive applications, the common line leading to the negative side of the battery.

GROUND-SIDE SWITCH – A switch located in the ground side of a circuit instead of the hot wire.

Hg (MERCURY) – A material used as a calibration standard for vacuum measurement.

"HARD" FAULT CODE – A circuit or component failure that reappears after codes have been cleared and the system has been retested.

HEATED OXYGEN SENSOR (HO2S) – The heated oxygen sensor monitors the oxygen content of the vehicle's exhaust gases, and generates a voltage signal (representing the air/fuel ratio) used by the vehicle's on-board computer for fuel control. The heated sensor contains a heating element to keep the sensor at consistent temperature, allowing the system to enter closed loop earlier and maintain closed loop operation with the engine at idle speed.

HIGH-RESISTANCE SHORT – A short circuit which draws a slow current.

HIGH TENSION SECONDARY VOLTAGE – Voltage which enables current to jump the spark plug gap. This voltage is caused by the collapse of the magnetic field around the coil secondary windings.

IDLE SPEED STEPPER (ISS) MOTOR – The ISS motor (used on some Jeep engines) controls airflow inside the throttle body bypass passage to control idle speed. The ISS motor operates under control of the vehicle's on-board computer.

IMPEDANCE – The total opposition of a circuit to the flow of alternating current, measured in ohms (includes resistance and reactance).

INDUCTION – The process of magnetizing and object, or of inducing a voltage in an object by placing it within a magnetic field.

INJECTOR – A fuel injection system electrical solenoid which, when energized, allows fuel flow into the intake manifold where it is mixed with air for combustion.

INPUTS – Information, in the form of a voltage or current, from a device external to the vehicle's on-board computer (switch, sensor, etc.) which assists the computer in monitoring and maintaining engine performance.

INSULATOR – Any material which will not conduct current. Insulators are commonly used to support or isolate conductors in an electrical/electronic circuit.

INTERMITTENT – Occuring infrequently (not contiuously) and usually on an irregular basis. In electrical circuits, it refers to an occasional open, short, or ground.

LAB OSCILLOSCOPE – An electronic device used to analyze voltages. The oscilloscope produces a picture of the voltage waveform on a CRT screen.

LIGHT-EMITTING DIODE (LED) – A positive/negative junction of crystal which produces light when forward bias current is applied.

"LIMP-IN" MODE – A condition where the vehicle's on-board computer has detected a faulty or failed input device (switch, sensor, etc) and has substituted a known value for the failed input. When this condition occurs, driveability is greatly affected; but will allow the operator to get the vehicle to a service facility.

LINEAR – A mathematically expressed relationship, the graphical representation of which is a straight line.

LOCK-UP TORQUE CONVERTER SOLENOID – A transaxle-mounted solenoid, operating under control of the vehicle's on-board computer, which engages the torque converter to directly connect the engine to the transaxle.

LOGIC MODULE – A microprocessor (located in the vehicle's on board computer) which receives inputs from the vehicle's engine control system sensors, and generates the output signals to control engine operation an an optimum balance between engine performance, vehicle emissions and fuel economy.

LOGIC PROBE – A device used to verify operation of a logic (on/off) circuit.

MAGNETIC FIELD – The portion of space near a magnetic body in which magnetic lines of force exist.

MAGNETIC PICK-UP COIL – Coil used in electronic distributor ignition systems to determine when to switch off the coil secondary.

MAGNETIC RELUCTANCE – The opposition of a magnetic substance to the flow of magnetic flux through it.

MALFUNCTION – A problem which causes a system to operate incorrectly. Typical malfunctions are wiring harness opens or shorts, failed sensors, or circuit components.

MALFUNCTION INDICATOR LIGHT (MIL) – Generic term for various warning lamps used to indicate malfunctions in the vehicle's engine management system (on-board computer and associated input/output devices).

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR – A sensor which sends a varying frequency signal (based on manifold vacuum and manifold pressure) to the vehicle's on-board computer for calculation of barometric pressure.

MERCURY (Hg) – A material used as a calibration standard for vacuum measurement.

MICROPROCESSOR – A small processor located in the vehicle's computer.

MODE – A specific state or condition of operation.

MODULE – A mechanical, electrical or electromechanical arrangement of components intended to perform a specific task (such as ignition). Modules are usually designed to allow easy removal and replacement.

NEUTRAL/SAFETY SWITCH – A switch which signals the vehicle's on-board computer that the automatic transaxle is in neutral. The computer uses this signal for spark timing control, torque converter clutch operation, and idle speed control.

O2 (OXYGEN) SENSOR – The oxygen sensor monitors the oxygen content of the vehicle's exhaust gases and generates a voltage signal (representative of the air/fuel ratio) used by the vehicle's on-board computer for fuel control.

OBD (ON-BOARD DIAGNOSTICS) – Refers to the self-testing ability of the vehicle's on-board computer which allows the computer to verify its own operational ability.

OHM – Unit of electrical resistance. A circuit has one ohm of resistance when one volt applied to it produces a current of one ampere.

OPEN CIRCUIT – A circuit which does not provide a complete path for the flow of current.

OSCILLOSCOPE – A test instrument used to analyze an electronic circuit. The oscilloscope displays circuit activity as a waveform on a CRT screen.

PARALLEL CIRCUIT – A circuit in which there are two or more paths for current flow.

PCM (POWERTRAIN CONTROL MODULE) – Generic term used to refer to the arrangement controllers/computers which control the engine management system, emissions systems, and the shift operations of automatic transmissions. This term is Federally mandated to standardize the terminology of engine management computers (beginning in the 1993 model year).

PCV (POSITIVE CRANKCASE VENTILATION) – A system which vents vapors from the crankcase into the engine intake system where they are burned in the engine cylinders rather than being discharged in the exhaust gases.

POTENTIOMETER (POT) – A variable resistor with three connections. The two ends of the resistive element each constitute one connection. The third connection (called the wiper) moves physically up and down the resistive element to vary the resistance of the device.

POWER LOSS LAMP – Term for the instrument panel-mounted lamp on early Chrysler vehicles (functions the same as the Check Engine Light).

POWER MODULE – A microprocessor which delivers commands from the on-board computer's Logic Module to the various actuators in the vehicle's engine control system.

PRESSURE REGULATOR – A device which controls the pressure of the fuel delivered to the fuel injector(s).

PRIMARY WINDING – The low voltage winding of the ignition coil which is electronically connected to its secondary winding only by the magnetic field they share. When the primary winding is connected across the supply voltage, a potential current flows through it, building a magnetic field around itself, and inducing a voltage in the secondary winding. When the primary winding is disconnected, the cease in current through the primary winding again induces a voltage in the secondary winding which provides current to the spark plugs to ignite the air/fuel mixture.

PULSE – An abrupt change in a voltage either (positive or negative).

RATIO – The relationship in quantity, amount or size between one value and another.

REFERENCE VOLTAGE (VREF) – Regulated voltage provided by the vehicle's computer to some vehicle sensors.

RELAY – A switch, operated by means of electromagnetism, which controls the opening and closing of another circuit of higher current capacity.

RESISTANCE – The property of a device or circuit which causes it to oppose the movement of current through it. The unit of electrical resistance is the ohm.

RESISTOR – An electronic component (most commonly made of carbon) which restricts the flow of current.

REST PRESSURE – Fuel pressure maintained within the fuel system after the engine is turned off.

SBEC (SINGLE BOARD ENGINE CONTROLLER) – This computer system is used on some post-1989 3.0L engine-equipped Chrysler Motors vehicles. The Logic Module and Power Module are combined on a single printed circuit board.

SECONDARY WINDING – The winding of the ignition coil which supplies high tension current to the spark plugs. The secondary winding is activated by the collapsing magnetic field of the primary winding.

SENSOR – Any component which can detect and relay information relating to the operational status of a component or system.

SENSOR TEST MODE – The diagnostic mode used to check the output signal of specific sensor with the engine off. Specific codes are entered on the SCAN tool to select the desired for test. The output of this mode is the actual output of the selected sensor (temperature, voltage, speed, etc.).

SERIES CIRCUIT – A circuit in which each component is attached, one end to the other, providing only one path for current flow.

SERVICE REMINDER INDICATOR (SRI) – Indicator light which informs the driver that the vehicle is due for service (called the Maintenance Reminder Light in pre-1993 vehicles).

SHORT – A generally unintended (accidental) connection in an electrical circuit which shortens the electrical path, and, depending on its location in the circuit, causes increased current to flow.

SINGLE MODULE ENGINE CONTROLLER (SMEC) – This computer system is used on some post-1987 Chrysler Motors vehicles. The Logic Module and Power Module are housed in a common enclosure.

"SOFT" FAULT CODE – A circuit or component failure, recorded by the vehicle's on board computer, that does not reappear after codes have been cleared and the system retested.

SOLENOID – A coil of wire, usually in the form of a long cylinder, with a moveable core. The core moves within the coil by means of electromagnetism, resulting from the application of current to the coil.

SOLID STATE – Refers to circuits which use transistors, integrated circuits, and/or other semi-conductors. Any electronic circuit which does not use vacuum tubes can be considered solid state.

SPARK ADVANCE – Causing spark to occur earlier.

SPARK RETARD – Causing less spark advance to be added, resulting in a spark which is introduced later.

SPEED (DISTANCE SENSOR) – Sensor is mounted at the transaxle tailshaft housing which transmits a signal representing vehicle speed to the vehicle's on-board computer.

STOICHIOMETRY – In automotive applications, the air/fuel ratio resulting in optimum combustion; it enables exactly all of the fuel to burn using exactly all of the available oxygen.

TBI (THROTTLE BODY INJECTION) – Any one of several fuel injection systems which have the fuel injector(s) mounted in a centrally-located throttle body, rather than close to an intake port.

THERMISTOR – A variable resistor which changes its resistance in relation to ambient temperature.

THROTTLE POSITION SENSOR (TPS) – A variable resistance (potentiometer) sensor which senses position proportional to the throttle position. The TPS is used to define the engine operating mode: either closed, part-throttle or wide open throttle (WOT).

TIMING – Generally refers to relationship between spark plug firing and piston position, (it can also refer to cam and valve timing) timing is most commonly expressed in crankshaft degrees before or after Top Dead Center (TDC) of the compression stroke.

TRANSDUCER – A device which is actuated by power from one system and supplies power (usually in another form) to a second system. A typical transducer in automotive applications is an electrically actuated vacuum regulator.

UP-SHIFT LIGHT – An indicator, primarily controlled by engine speed and manifold vacuum, which provides a visual indication of when to shift to the next higher gear to obtain maximum fuel economy.

VACUUM – Describes a pressure that is less than atmospheric pressure; negative pressure.

VACUUM ADVANCE – A method of advancing ignition timing based on engine load conditions. Vacuum advance is accomplished by using engine intake manifold vacuum to operate the distributor diaphragm.

VACUUM CHECK VALVE (VCV) – A one-way flow control valve used to retain a vacuum signal in system after the vacuum source is gone.

VACUUM REGULATOR – A device with provides a constant vacuum output when vehicle is at idle, and switches to engine vacuum when the vehicle is at off idle.

VACUUM REGULATOR/SOLENOID – A regulator valve, under control of the vehicle's on-board computer, which provides vacuum to the feedback carburetor.

VACUUM RETARD DELAY VALVE (VRDV) – Delays a decrease in vacuum at the distributor vacuum advance until the source of vacuum decreases.

VEHICLE EMISSION CONTROL INFORMATION (VECI) – Factory specifications for servicing the vehicle's emission system. The VECI decal is located in engine compartment.

VOLTAGE – The electromotive force that moves electrons through a conductor. One volt moves one ampere of current through one ohm of resistance.

VOLUMETRIC EFFICIENCY – Volumetric efficiency is a combination between ideal and actual efficiency of an internal combustion engine. In actual operation, volumetric efficiency is lowered by the inertia of gases, friction between gases and manifolds, the temperature of gases, and the pressure of air entering the engine. If the engine was able to completely fill each cylinder on the intake stroke, volumetric efficiency would be 100%.

WASTEGATE CONTROL SOLENOID – Controls the boost output on turbocharged engines. The vehicle's computer adjusts the duty cycle of the solenoid to provide maximum boost under varying operating conditions.

WOT – Wide open throttle.

4.1 COPYRIGHT NOTICE

4.2 SERVICE PROCEDURES

If you have any questions, please contact your local store, distributor or the Manufacturer's Service Department.

USA & Canada:
(800) 544-4124 (8:00-4:00, Monday-Friday PST)

All others:
(714) 241-6802 (8:00-4:00, Monday-Friday PST)

FAX:
(714) 432-7910 (24 hr.)

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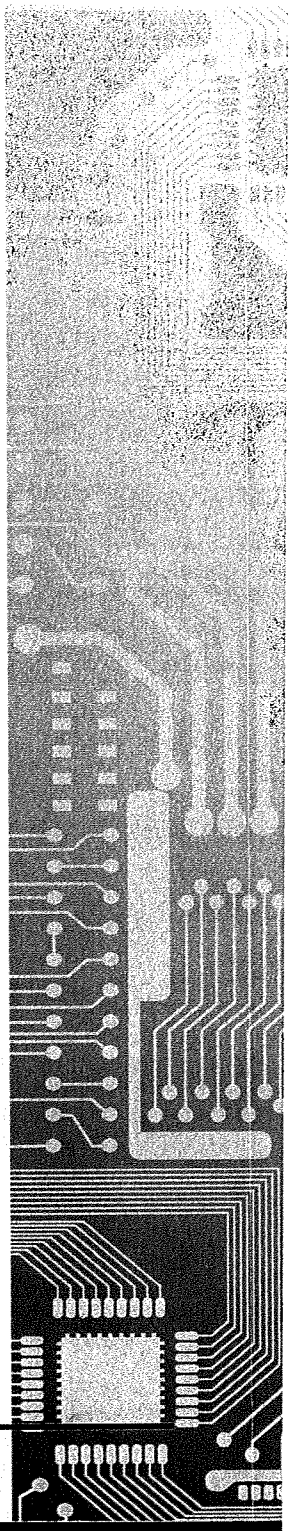

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